

**OVERSIGHT HEARING:
NUCLEAR REGULATORY COMMISSION**

HEARING
BEFORE THE
SUBCOMMITTEE ON CLEAN AIR
AND NUCLEAR SAFETY
OF THE
COMMITTEE ON
ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE
ONE HUNDRED ELEVENTH CONGRESS
SECOND SESSION

MAY 5, 2010

Printed for the use of the Committee on Environment and Public Works



Available via the World Wide Web: <http://www.gpo.gov/fdsys>

U.S. GOVERNMENT PUBLISHING OFFICE

22-441 PDF

WASHINGTON : 2016

For sale by the Superintendent of Documents, U.S. Government Publishing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512-1800; DC area (202) 512-1800
Fax: (202) 512-2104 Mail: Stop IDCC, Washington, DC 20402-0001

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

ONE HUNDRED ELEVENTH CONGRESS
SECOND SESSION

BARBARA BOXER, California, *Chairman*

MAX BAUCUS, Montana	JAMES M. INHOFE, Oklahoma
THOMAS R. CARPER, Delaware	GEORGE V. VOINOVICH, Ohio
FRANK R. LAUTENBERG, New Jersey	DAVID VITTER, Louisiana
BENJAMIN L. CARDIN, Maryland	JOHN BARRASSO, Wyoming
BERNARD SANDERS, Vermont	MIKE CRAPO, Idaho
AMY KLOBUCHAR, Minnesota	CHRISTOPHER S. BOND, Missouri
SHELDON WHITEHOUSE, Rhode Island	LAMAR ALEXANDER, Tennessee
TOM UDALL, New Mexico	
JEFF MERKLEY, Oregon	
KIRSTEN GILLIBRAND, New York	
ARLEN SPECTER, Pennsylvania	

BETTINA POIRIER, *Staff Director*

RUTH VAN MARK, *Minority Staff Director*

SUBCOMMITTEE ON CLEAN AIR AND NUCLEAR SAFETY

THOMAS R. CARPER, Delaware, *Chairman*

MAX BAUCUS, Montana	DAVID VITTER, Louisiana
BENJAMIN L. CARDIN, Maryland	GEORGE V. VOINOVICH, Ohio
BERNARD SANDERS, Vermont	CHRISTOPHER S. BOND, Missouri
JEFF MERKLEY, Oregon	JAMES M. INHOFE, Oklahoma (<i>ex officio</i>)
BARBARA BOXER, California (<i>ex officio</i>)	

C O N T E N T S

Page

MAY 5, 2010

OPENING STATEMENTS

Carper, Hon. Thomas R., U.S. Senator from the State of Delaware	1
Inhofe, Hon. James M., U.S. Senator from the State of Oklahoma	4
Voinovich, Hon. George V., U.S. Senator from the State of Ohio	6
Alexander, Hon. Lamar, U.S. Senator from the State of Tennessee	10
Sanders, Hon. Bernard, U.S. Senator from the State of Vermont	11

WITNESSES

Jaczko, Hon. Gregory B., Chairman, U.S. Nuclear Regulatory Commission	13
Prepared statement	16
Responses to additional questions from:	
Senator Boxer	28
Senator Carper.....	30, 116
Response to an additional question from Senator Whitehouse	36
Responses to additional questions from:	
Senator Udall	40
Senator Inhofe.....	45, 116
Senator Voinovich	88
Senator Vitter	94
Svinicki, Hon. Kristine L., Commissioner, U.S. Nuclear Regulatory Commission	118
Apostolakis, Hon. George, Commissioner, U.S. Nuclear Regulatory Commission	119
Magwood, Hon. William D., IV, Commissioner, U.S. Nuclear Regulatory Commission	120
Ostendorff, Hon. William C., Commissioner, U.S. Nuclear Regulatory Commission	121
Meserve, Richard, President, Carnegie Institution for Science; former Commissioner, U.S. Nuclear Regulatory Commission	147
Prepared statement	149
Response to an additional question from:	
Senator Carper	157
Senator Inhofe	159
Senator Voinovich	160
Bradford, Peter A., Adjunct Professor, Institute for Energy and the Environment, Vermont Law School; former Commissioner, U.S. Nuclear Regulatory Commission	162
Prepared statement	164
Singh, K.P. "Kris," President and Chief Executive Officer, Holtec International	170
Prepared statement	172
Responses to additional questions from Senator Carper	176
Response to an additional question from Senator Voinovich	178
Vanderheyden, George, President and Chief Executive Officer, UniStar Nuclear Energy, LLC	179
Prepared statement	181
Response to an additional question from Senator Carper	199
Responses to additional questions from:	
Senator Inhofe	200
Senator Voinovich	204

OVERSIGHT HEARING: NUCLEAR REGULATORY COMMISSION

WEDNESDAY, MAY 5, 2010

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON CLEAN AIR AND NUCLEAR SAFETY,
Washington, DC.

The Subcommittee met, pursuant to notice, at 10 a.m. in room 406, Dirksen Senate Office Building, Hon. Thomas R. Carper (Chairman of the Subcommittee) presiding.

Present: Senators Carper, Inhofe, Voinovich, Alexander, and Sanders.

OPENING STATEMENT OF HON. THOMAS R. CARPER, U.S. SENATOR FROM THE STATE OF DELAWARE

Senator CARPER. We can come to order.

Good morning, one and all. Senator Inhofe and I are happy to welcome you. We will be joined by others of our colleagues as we get into this hearing.

Senator Vitter, our Ranking Member, may be in Louisiana. I am not sure, but given the threats that they face, my guess is both he and Senator Landrieu may be down there today.

But in any event, we are here, and we are happy that you are here. This is a timely hearing. I think it will be constructive. I think it will also be instructive, too.

When Senator Inhofe was the Chair of the Subcommittee, he initiated a series of hearings on a regular basis to do oversight of the NRC and to help strengthen its ability to do its job and make sure they have the resources that they need. And we have attempted to continue that tradition, even to this day.

Today's oversight hearing is focused on the Nuclear Regulatory Commission and gives us a chance to hear I think for the first time, at least before the Senate, from our new full complement of Commissioners. And we are very proud, actually, of the folks who serve today. We think this is a very strong group, and we are anxious to see how you act together and how you work as a team. This is the first chance we have had to see this.

But I am going to make an opening statement. I am going to recognize Senator Inhofe and others who might come in. Then I will give a brief introduction of our witnesses, and then we will call on you to speak.

But we are here today to examine the NRC to see if it is meeting its core principles of good regulation in the licensing of new reactors and in the oversight process of the current nuclear fleet. Over

the past 30 years the American public has dramatically shifted its views on nuclear energy. Every day, more Americans are recognizing that nuclear energy provides clean, reliable power and provides good paying American jobs.

Public confidence in nuclear has risen because Americans have seen real clean air benefits from nuclear power. Unlike coal-fired plants, nuclear power does not emit dangerous air pollutants such as sulfur dioxide, nitrogen oxide and mercury or even carbon dioxide, which combined can kill thousands of Americans every year.

In fact, over the past 12 years the current nuclear fleet has prevented emissions, I am told, of 8.7 billion metric tons of carbon dioxide, 47.2 million tons of sulfur dioxide, and 18.9 million tons of nitrogen oxide into our Nation's air. As our Nation's energy demands grow, we are going to need more nuclear power to meet our clean air and our climate goals.

Public confidence in nuclear has also risen because Americans have seen real job opportunities from nuclear power. As we will hear today, America's nuclear manufacturers and vendors are growing high quality American jobs which produce parts, components and services known for quality and safety around the world. Building a new generation of nuclear power plants would create even more good paying jobs.

According to an Idaho National Laboratory study, roughly 38,000 additional manufacturing jobs are expected to be created in this country from nuclear power plants construction through the year 2020.

But the main reason that public confidence in the nuclear industry has grown over the past 30 years is safety. America's 104 operating nuclear reactors have become safer. They have also become more efficient over the past 30 years, in fact, over the last 10 years.

Today, the nuclear industry has one of the best safety records of any industry in the United States. Much of that safety record is due to a change in culture within the nuclear industry and due to the diligence of the NRC. Every nuclear power plant site receives a minimum of 2,000 hours of inspections by the NRC personnel each year, paid for by the nuclear industry and by ratepayers. The nuclear industry also conducts its own independent testing and safety reviews.

As I like to say, if it isn't perfect, let's make it better. Today, we will explore how we might make the NRC even more effective through the prism of the NRC's five founding principles of good regulation: independence, openness, efficiency, clarity, and reliability. There is probably an acronym for that, but I am not going to go there.

In reading your testimony today, I am reminded that is an acronym for almost everything. This is probably a good point for me to say I don't like acronyms. NRC is fine. We had a hearing last month where one of the fellows testifying in one sentence, he had four acronyms, each of which had other meanings in other contexts. So I would ask you, stay away from those acronyms, and it will make me a happier Chairman.

As the oversight committee on nuclear safety, it is our job to make certain that safety is the No. 1 priority for the nuclear industry and for the NRC. It is also our job to make certain that the

NRC remains a strong, independent and effective regulator, a regulator that acts decisively, acts openly and transparently, and produces results and is worthy for the public's confidence.

Let me close by again thanking each of our witnesses for joining us here today. I want to thank you for your service to our country. It is an important and valuable service that you are performing. We look forward to your testimony. We look forward to the questions that will follow and the discussion that will ensue.

And with that having been said, let me now recognize the former Chairman of this Subcommittee, who shares the interests of Senator Voinovich and Alexander and I on these issues.

Senator Inhofe.

[The prepared statement of Senator Carper follows:]

STATEMENT OF HON. THOMAS R. CARPER,
U.S. SENATOR FROM THE STATE OF DELAWARE

We are here today to examine the Nuclear Regulatory Commission (NRC) to see if it is meeting its core principles of good regulation in its licensing of new reactors and in its oversight processes of the current nuclear fleet.

Over the past 30 years, the American public has dramatically shifted its views on nuclear energy. Every day, more Americans are recognizing that nuclear energy provides clean, reliable power and provides good paying American jobs.

Public confidence in nuclear has risen because Americans have seen real, clean air benefits from nuclear power. Unlike coal-fired power plants, nuclear power does not emit dangerous air pollutants—such as sulfur dioxide, nitrogen oxide, mercury or carbon dioxide—which kill thousands of Americans every year.

In fact, over the past 12 years the current nuclear fleet has prevented emissions of 8.7 billion metric tons of carbon dioxide, 47.2 million tons of sulfur dioxide, and 18.9 million tons of nitrogen oxide into our Nation's air.

As our Nation's energy demands grow, we are going to need more nuclear power to meet our clean air and climate goals.

Public confidence in nuclear has also risen because Americans have seen real job opportunities from nuclear power.

As we will hear today, America's nuclear manufacturers and vendors are growing high quality American jobs, which produce parts, components, and services known for quality and safety around the world.

Building a new generation of nuclear power plants would create even more good paying jobs. According to an Idaho National Laboratory study, roughly 38,000 additional nuclear manufacturing jobs are expected to be created in this country from new nuclear power construction through 2020.

But the main reason that public confidence in the nuclear industry has grown over the past 30 years is safety. America's 104 operating nuclear reactors have become safer and more efficient over the past 30 years.

Today, the nuclear industry has one of the best safety records of any industry in the United States. And much of that safety record is due to a change in culture within the nuclear industry and due to the diligence of the NRC.

Every nuclear power plant site receives a minimum of 2,000 hours of inspections by the NRC personnel each year, paid for by the nuclear industry and by rate payers. The nuclear industry also conducts its own independent testing and safety reviews.

But as I like to say, if it isn't perfect, make it better.

Today we will explore how we might make the NRC even more effective through the prism of the NRC's five founding principles of good regulation—independence, openness, efficiency, clarity, and reliability.

As the oversight committee on nuclear safety, it is our job to make certain that safety is the No. 1 priority for the nuclear industry and the NRC.

It is also our job to make certain that the NRC remains a strong, independent, and effective regulator. A regulator that acts decisively, that acts openly and transparently, that produces results and is worthy of the public's confidence.

Let me close by again thanking each of our witnesses for joining us here today. We look forward to your testimony and to the questions and discussion that will follow.

**OPENING STATEMENT OF HON. JAMES M. INHOFE,
U.S. SENATOR FROM THE STATE OF OKLAHOMA**

Senator INHOFE. Thank you, Mr. Chairman.

You said something that kind of sparked a memory in me. When I first became Chairman of the Subcommittee, at that time, of course, Republicans were in the majority, the NRC hadn't had an oversight hearing in 12 years. And so we started into that. I said a little bit about this, Mr. Jaczko, to you in my office. We set up something where we would have certain things that were going to be happening in the future, and then had oversight hearings every 6 months, and it worked real well.

Then along came Senator Voinovich. He was such an attractive addition to this Committee because when he was Governor of Ohio, he was kind of the expert in the Governors' Association on air issues and nuclear issues. So he also has chaired this Subcommittee. So you have three of us up here now.

I want to say welcome to our new Commissioners, particularly now since I have learned how to pronounce Apostolakis. And Mr. Magwood, it is good to see us all with a full complement here.

Senator CARPER. Would the gentleman yield?

Senator INHOFE. Yes.

Senator CARPER. If you look at the names of at least our first three witnesses, I think there has got to be a requirement for tough names in order to even be considered for this Commission. You don't make it easy for us.

[Laughter.]

Senator INHOFE. Acronyms might be better.

[Laughter.]

Senator INHOFE. Anyway, we are beyond that now, and we are having these oversight hearings. We all, I think, want the same thing. Certainly, we up here are all united in wanting to get these licenses moving. We want to get deadlines adhered to.

The Bipartisan Policy Center noted in its recent review that there have been problems in the process, which is not surprising since no one has licensed a new plant in some 30 years. And I share the Center's view that both the NRC staff and the industry have been diligent in working through real challenges.

They also noted, "nearly all applicants indicate that certainty in scheduling is more crucial than speed." And I would add the word, something that we can anticipate is going to happen so that we would now. Because there are a lot of moving parts out there in terms of people in the financial community and others. We want predictability as well as certainty.

Two and a half years have passed and NRC has yet to indicate whether it expects to issue any licenses. This raises questions of reliability in management. The Commission testimony states, "By 2012, the NRC may be approaching a final decision on the first of the COLs." Then again, it may not. That is hardly a recipe for predictable licensing.

I am glad to hear the Commission's high regard for the NRC staff and its reliability to conduct efficient, predictable and thorough reviews. The NRC staff and license applicants are laboring to produce safety evaluation reports and environmental reports according to schedules outlined by the NRC staff.

This part of the process is the bulk of the new plant license review that resolves the vast majority of issues and questions. I am pleased that there is a basic schedule for managing this large and complex workload.

But following the conclusion of the staff's review, there is no schedule. The NRC reliability principles state, "regulatory action should always be decisively administered so as to lend stability to the nuclear operational and planning process." Let me say that planning the construction of \$15 billion nuclear plants is a very complex process. How can these companies develop a construction schedule and plan the hiring of 3,000 construction workers if they don't know when they can start? And how can investors feel confident about backing these projects if the agency itself is either incapable or unwilling to predict when it will finish its work?

The Commission indicates in its testimony the Commission is fully confident that the agency can successfully and efficiently meet its regulatory responsibilities with regard to these matters.

I am glad to hear that, but it is high time the Commission lead by example and give stakeholders a reason to have confidence. The NRC should make clear to the public, the applicants, and the investors how it is managing new plant licensing. They can do this by establishing a transparent process with complete schedules and milestones to measure results. And I am hoping that is exactly what we will do. That is kind of our challenge to you folks.

Thank you, Mr. Chairman.

[The prepared statement of Senator Inhofe follows:]

STATEMENT OF HON. JAMES M. INHOFE,
U.S. SENATOR FROM THE STATE OF OKLAHOMA

I want to start by saying welcome to our three new commissioners, Magwood, Ostendorff, and Apostolakis. It's good to see the NRC with a full complement of commissioners. I appreciate Senators Carper's and Vitter's focus today on the NRC's Principles of Good Regulation. These principles can help the public evaluate the NRC's effectiveness as a regulator. I will focus my remarks on the new plant licensing process measured against the last principle: reliability.

The NRC has been reviewing applications for new nuclear plants for over 2 and a half years. As the Bipartisan Policy Center noted in its recent review, there have been fits and starts in the process—which is not surprising since no one has licensed a new plant in 30 years. I share the Center's view that both the NRC staff and the industry have been diligent in working through real challenges.

The Center also noted, "Nearly all applicants indicated that certainty in scheduling is more crucial than speed." I share that view and remain concerned with the lack of complete and publicly available schedules. Two and a half years have passed, and the NRC has yet to indicate when it expects to issue any licenses. This raises questions of reliability and management.

The Commission's testimony states, "By 2012, the NRC may be approaching a final decision" on the first COLs. Then again, it may not. That's hardly a recipe for a predictable licensing process.

I'm glad to hear the Commission voice high regard for the NRC staff's ability to conduct efficient, predictable, and thorough reviews. NRC staff and license applicants are laboring to produce Safety Evaluation Reports and Environmental Reports according to schedules outlined by the NRC staff. This part of the process is the bulk of the new plant license review and resolves the vast majority of issues and questions. I'm pleased that there is a basic schedule for managing this large and complex workload.

But following the conclusion of the staff's review, there is no schedule.

NRC Reliability Principles state, "Regulatory actions should always be ... decisively administered so as to lend stability to the nuclear operational and planning processes." Let me say that planning the construction of \$15 billion nuclear plants is a very complex process. How can these companies develop a construction schedule and plan the hiring of 3,000 construction workers if they don't know when they can

start? How can investors feel confident about backing these projects if the agency itself is either incapable or unwilling to predict when it will finish its work?

The Commission indicates in its testimony, "The Commission is fully confident that the agency can successfully and effectively meet its regulatory responsibilities with regard to all these matters." I'm glad to hear that, but it's high time the Commission lead by example and give stakeholders a reason to have confidence. The NRC should make clear to the public, applicants, and investors how it is managing new plant licensing; it can do this by establishing a transparent process with complete schedules and milestones to measure results.

Senator CARPER. Thank you, Senator Inhofe.

Senator Voinovich. Another former Chairman. George and I have been working these issues for a long time.

It is great to see you, George.

**OPENING STATEMENT OF HON. GEORGE V. VOINOVICH,
U.S. SENATOR FROM THE STATE OF OHIO**

Senator VOINOVICH. Thank you.

I would like to publicly congratulate Senator Carper on doing an outstanding job as Chairman of this Subcommittee. I was concerned that after I did not have the chairmanship where we were going. And Senator Carper, as he has in the past, when I was Chairman of the National Governors Association, he became Chairman. He did a better job than I did. We are both active in the Jobs for America's Graduates. He was Vice Chairman, then became Chairman. Did a better job.

I just want to say that I am really tickled that Senator Carper has taken this on and is giving it the attention that it deserves, because it is very, very important at this time. I just want to publicly thank you, Tom, for what you are doing.

Senator CARPER. The Chair will yield as much time as the gentleman from Ohio needs.

Senator VOINOVICH. OK, thanks.

[Laughter.]

Senator CARPER. Let me just say, I stand on the shoulders of those who came before, both in the NGA and Jobs for America's Graduates, on this Committee and Subcommittee. It is just a joy to work with George.

Senator INHOFE. Lamar, you and I are left out of this thing aren't we?

Senator ALEXANDER. So far.

[Laughter.]

Senator CARPER. Not for long.

Senator VOINOVICH. Anyhow, I would like to welcome the Commissioners and the panelists, and I look forward to hearing your testimony.

It is heartwarming to see we have a full panel today, five Commissioners. And I made a promise to a former Commissioner, a man by the name of Ed McGaffigan. And he was on his last legs, and he came to see me in my office. And he made me promise that I would continue to take an interest in the NRC as much as I had been, and that I would do everything in my power to make sure that we had outstanding people as Commissioners.

And Mr. Chairman, I am very, very proud of the people that are sitting in front of us. They are an outstanding group of individuals

and we are lucky to have the quality of individuals that we have that are on the Commission.

Mr. Chairman, as you know, I have spent the better part of 10 years involved in shaping nuclear energy policy for the country. During that time, the Committee has focused a great deal of time and effort on oversight of the NRC. We did this primarily to make sure it was doing its job ensuring the safety and security of our Nation's nuclear plants, but also to ensure that the NRC was ready to meet the challenge of enabling a nuclear renaissance in this country.

I take great pride in the fact that this Committee has helped the NRC become one of the best and most respected regulatory agencies in the world. If imitation is the sincerest form of flattery, then the world is paying NRC a very high compliment because most of the countries in the world today adopt the NRC standards and practices.

On a personal note, I was at the Santa Fe Seminar on Nuclear Energy in November of last year. I met with the Japanese representatives. They sought me out just to let me know how much they thought of our NRC and the fact that they thought it was the gold standard in the world.

We worked very hard as a Committee to place the right people on the Commission, and I have already talked about that. The thing that I am also very proud of is that the NRC, and I don't know if the Commissioners know that, is known as the best place to work in the entire Federal Government, the best place to work.

Nevertheless, the Committee and the NRC have got to remain vigilant. Although the operating performance of today's plants has continued to improve, both industry and the NRC must remain focused on safety, or we are going to lose the public support for nuclear power. Just see what has happened now with that oil rig down there and what it has done to the people's feeling about going after more oil.

For those at the hearing, I want to reinforce that we all understand that nuclear safety is a global issue. A reactor accident anywhere in the world will greatly affect public support for nuclear power here in the United States. This means that industry and the NRC cannot be inwardly focused on the U.S. and instead must monitor developments internationally and coordinate safety information with the appropriate nuclear authorities.

Enhancing public support is absolutely essential for the rebirth of this industry.

And our country does need nuclear power. I like to tell people nuclear is a three-fer. It provides the reliable baseload electricity our country demands. People forget about that. It is 20 percent of our energy; 70 percent of our clean energy comes from nuclear. It will help us reach our goal of reducing carbon emissions and it will strengthen our manufacturing base and create good paying jobs.

Mr. Chairman, I wasn't aware of how many jobs it is predicted they are going to have during the next 10 years.

As demonstrated by President Obama's recent call for increased use of nuclear power in the State of the Union Address and the DOE's fiscal year budget for 2011, an additional \$36 billion for nuclear loans are going to be provided. I think that momentum is

building and the policy environment in the U.S. is shifting toward the growth of nuclear power.

The Bipartisan Center, Senator Inhofe, you mentioned what they did. They came back with a pretty darn good evaluation of both sitting down and looking at the Commission and getting opinions.

And Chairman Jaczko, I want to commend you for the great job that you are doing as the leader there. The fact that people looking over your shoulder have said, hey, these people are trying to do the right job. And although there are still things that need to be done, and my suggestion would be they have some suggestions. And I know in your response, you indicated that we start to look at some of those in 2011.

I would really like to particularly look at the environmental studies that have to be made to try and make sure that whoever does that has got the gear to get that job done.

I am also hearing from CEOs of companies that are very interested in new plants, not just for new large light water reactors but also for the SMRs. And we met recently with American Society of Nuclear Scientists. They talked about how we have fallen behind after Three Mile Island, and that we have this excellent opportunity to get back in the business with these modular units, and particularly in light of the fact that the cost of the big ones is almost prohibitive, that this is a wonderful opportunity for our country and also to not only create jobs but get back in the international marketplace.

And that is one of the things that I am hoping that the Commission will look at to see where we are juxtaposed, say, with China. China is trying to get into the business, and others are. Where are we? And how can we recapture our leadership in this area?

Mr. Chairman, I have spoken too long and exceeded my time, but I am just excited to be here today, and Brother McGaffigan is looking down at us now, and he has a big smile on his face.

Thank you.

[The prepared statement of Senator Voinovich follows:]

STATEMENT OF HON. GEORGE V. VOINOVICH,
U.S. SENATOR FROM THE STATE OF OHIO

Chairman Carper, thank you for holding this hearing. I would like to welcome the NRC Commissioners and industry panelists, and I look forward to hearing your testimony. I note with pleasure that we have a full complement of Commissioners for the first time in several years.

I want to share with you at the outset that I had made a promise to a friend of mine, the late Commissioner Ed McGaffigan, who I greatly respected for his service and contributions to our country. I had promised him that I would take care of NRC and ensure that the NRC Commissioner positions would be filled with high quality people, people who were dedicated to enabling the safe use of nuclear materials in the U.S. I am pleased to say that I have now been able to honor my promise to Ed McGaffigan.

Mr. Chairman, as you know, I have spent the better part of the last 10 years in the Senate involved in shaping nuclear energy policy for this country, mainly as Chairman or Ranking Member on this Clean Air and Nuclear Safety Subcommittee. During that time, this Committee focused a great deal of time and effort on oversight of the Nuclear Regulatory Commission (NRC). We did this primarily to make sure it was doing its job of ensuring the safety and security of our Nation's nuclear power plants but also to ensure that the NRC was ready to meet the challenge of enabling a nuclear renaissance in this country.

Mr. Chairman, I take great pride in the fact that this Committee has helped the Nuclear Regulatory Commission become one of the best and most respected regulatory agencies in the world. If imitation is the sincerest form of flattery, then the

world is paying NRC a very high complement, because most of the countries in the world today adopt the NRC's standards and practices.

On a personal note, I was at the Santa Fe Seminar on Nuclear Energy in November of last year, and the Japanese representatives sought me out to tell me what they thought of NRC. They were very complimentary, calling NRC approval of procedures or designs the "gold standard" in the nuclear industry.

We have worked very hard as a Committee to place the right people on the Commission, provide the NRC with the right resources and tools necessary to do its job, and hold them accountable for results. I believe we have been very successful in this endeavor, and at the same time we have created the positive environment necessary for a high performing organization. I think we should take great pride in the fact that NRC continues to be ranked as "the best place to work" among large Federal agencies.

Nonetheless, both this Committee and the NRC must remain vigilant. Although the operating performance of today's plants has continued to improve, both industry and NRC must remain focused on safety, or we will lose public support for nuclear power. For those at this hearing, I want to reinforce that we all understand that nuclear safety is a global issue. A reactor accident anywhere in the world will greatly affect public support for nuclear power here in the U.S. This means that industry and the NRC cannot be inwardly focused on the U.S. and instead must monitor developments internationally and coordinate safety information with the appropriate nuclear authorities. Enhancing public support is absolutely essential for a rebirth of the nuclear industry.

And our country does need nuclear power. I like to tell people nuclear is a three-fer: it provides the reliable, base load electricity our country demands; it will help us reach our goal of reducing carbon emissions; and it will strengthen our manufacturing bases and create good paying jobs. As demonstrated by President Obama's recent call for increased use of nuclear power in his State of the Union address and the DOE's fiscal year 2011 budget request for an additional \$36 billion for nuclear loan guarantees, I think that momentum is building, and the policy environment in the United States is shifting toward the long awaited growth in nuclear power.

The Bipartisan Policy Center (BPC) issued its independent assessment report of the new reactor licensing process on April 6, 2010. This was a very positive report. The Center's assessment was that the NRC and industry have done a remarkable job under trying circumstances during this initial licensing of new nuclear power plants. It speaks very well for making the nuclear renaissance in the U.S. a reality. I'd like to commend Chairman Jaczko and the NRC Commissioners, the NRC staff, and the nuclear industry for their coordinated effort and hard work demonstrated to date. Keep up the good work.

While the BPC report is very encouraging, we must keep the momentum going. I am very concerned that we are allowing our global leadership in nuclear power to erode. I have been informed that we have actually fallen behind in this key U.S. technology—reportedly China is breaking ground on building a new fleet of reactors as we speak.

I am hearing from the CEOs of companies that they are very interested in new plants, but not just for new large light water reactors similar to today's plants. They are also very interested in the development of small modular reactors (SMRs) that are more affordable and adaptable to the specific needs of a company. SMRs represent a whole new area where America can regain its leadership role and export our technology, and as such they represent a very unique and important opportunity for us. In particular, the SMRs of light water reactor technology build upon our expertise from small Navy nuclear reactors and represent a near-term, high technology growth industry for the U.S.

I have met with Mr. Steven Chu, the Secretary of the Department of Energy, and DOE is very much trying to support the nuclear renaissance, including the development of these new SMRs. I believe that many of the pieces of the nuclear puzzle are being put into place, which makes it a very exciting time for those at this hearing.

In summary, I believe that today's oversight hearing is a very important one. I urge all of us to continue to maintain our focus on the safety of operating reactors while we thoughtfully address the challenges remaining to enable the development of a technology so vital to America's future.

Thank you, Mr. Chairman, and I look forward to hearing from our distinguished panelists.

Senator CARPER. Thank you for invoking that name, George.

Among the things that unite the four of us on this side of the dais is our interest in reducing emissions of sulfur dioxide, nitrogen

oxide and mercury. And the four of us have probably worked as hard as anybody in the Senate on those issues. One of the things that draws us together is the realization that nuclear power done right can help us reduce those emissions and do a lot of other good things as well.

I am very pleased to be able to partner with Lamar Alexander on this issue as we work, and I think are coming closer to finding common ground with Senator Inhofe and with Senator Voinovich. Lamar.

**OPENING STATEMENT OF HON. LAMAR ALEXANDER,
U.S. SENATOR FROM THE STATE OF TENNESSEE**

Senator ALEXANDER. Thanks, Mr. Chairman.

I salute Senator Carper for his leadership on clean air, and Senator Voinovich's years of work on the subject, and Senator Inhofe's leadership on the subject. And that was a very important statement that you made in the last month and should make a great difference.

This hearing is taking place in the shadow of an oil spill that may turn out to be our worst. We are also aware of other recent tragedies: coal mine explosions in Virginia, natural gas plant explosions in Connecticut, a billion gallons of coal ash in Tennessee.

So when we talk about the risks of nuclear power, I think it is important that we compare then with risks of other forms of energy. I believe nuclear has something to teach other forms of energy.

Overall, the nuclear industry has an outstanding safety record. There have been accidents at nuclear power plants. We all think of Three Mile Island, but it is important in light of what is happening this week in the Gulf to remember that that was a partial meltdown. The containment systems worked. It released a non-hazardous radioactive gas. There were no health effects of damage to the environment that I am aware of from Three Mile Island.

The latest figures from OSHA show that working in the nuclear industry is safer than working in finance, insurance and real estate. You are safer doing maintenance or engineering work on a nuclear reactor than you would be sitting in front of a computer terminal trying to figure out how derivatives work.

Patrick Moore, the co-founder of Greenpeace, and who is now a prominent supporter of nuclear, says he wouldn't mind living in a nuclear reactor, which should be no surprise to sailors who have been doing that since the 1950s without a nuclear reactor accident in the United States. So we can be proud of that. But we shouldn't be complacent. We have all seen what happened in the Gulf this week. We don't want that to happen in the nuclear industry.

I would like to move along the certifications and licenses. I believe climate change is a problem. I think nuclear is the preferred solution for carbon-free electricity, but I want to make sure we do that as safely as possible. And as we examine this today and in other hearings, I want to make sure we weigh the dangers of nuclear against what might replace it.

Twenty-four thousand people die, according to the Environmental Protection Agency, every year from coal plant emissions. I mentioned other tragedies that we have seen. Well, here is another ex-

ample. We are horrified by what we see that may be happening to water fowl in the Gulf of Mexico, but a major oil company was fined \$600,000 under the Migratory Bird Treaty Act for the death of 85 birds not long ago. But the American Bird Conservancy says that wind turbines are killing 275,000 birds a year, just the ones we have, and what if we had the 180,000 wind turbines that it would take to produce 20 percent of our electricity?

And as we think about the new big wind farm in Cape Cod, in scenic Nantucket Sound, we should remember that we can compare other costs and benefits. It will produce about the same amount of electricity, although it covers an area the size of Manhattan Island, that one small modular reactor would produce more reliably and over the long term, I believe, at a cheaper cost.

I am enormously pleased with the President's appointments to the Nuclear Regulatory Commission. I am glad to have strong, sensible members of the Commission, all of them here, who are not afraid of nuclear power and who are not afraid to keep it safe. That is what we want.

At the same time, the rest of the world has moved ahead of us. There are 56 reactors being built around the world in many countries. Only one is about to start in the United States, and one hasn't started for 30 years. If we were going to war, we wouldn't put our nuclear Navy in mothballs, and if we are serious about clean energy, we shouldn't put our nuclear power plants in mothballs, either.

So I congratulate the Chairman on holding this hearing. I would think one of our major responsibilities would be oversight of nuclear power, as committed as we all are to its success and as committed as we all are to its safety. So I look forward to spending whatever time you think is necessary, Mr. Chairman, in other hearings and meetings as we try to help the Nuclear Regulatory Commission do its job.

Thank you.

Senator CARPER. Senator Alexander, thank you very, very much.

Again, we welcome our panelists today. Our lead-off hitter is the Chairman, Chairman Jaczko, and he will be followed by Commissioner Svinicki.

And we have been joined by Senator Sanders. You slipped in on me, pal. Welcome. You are recognized. Please proceed.

**OPENING STATEMENT OF HON. BERNARD SANDERS,
U.S. SENATOR FROM THE STATE OF VERMONT**

Senator SANDERS. Thank you very much, Mr. Chairman. I will be brief.

My views are a little bit different than Senator Alexander's, so let me give you the other side of the story. The other side of the story is that in the State of Vermont, Senators and members of the Commission, we have had a significant number of problems with the Vermont Yankee nuclear power plant, which is an old plant and had a radioactive tritium leak that started in January at levels many times higher than EPA's standard for drinking water.

Tritium is known to cause cancer and birth defects, and although no tritium has been detected in area drinking water there is evidence that tritium has leaked into the Connecticut River, a major

river between Vermont and New Hampshire. And the entire crisis has severely undermined public confidence in the plant. No question about that. I think if you asked the people of the State of Vermont today how they feel about the Yankee nuclear power plant, I think there is overwhelming distrust of the plant.

And this is in part because Entergy, the operator of the plant, misled State officials and the public as to the existence of underground pipes at the plant that carried radioactive material. They had denied that to members of the State legislature.

As you may know, I in fact strongly support the bipartisan decision of the Vermont State Senate, which under Vermont law voted 26 to 4, not a close vote, not to extend the operations of Vermont Yankee beyond 2012. The vote was 26 to 4 in the Vermont State Senate.

Vermont is showing the Nation that we do not need nuclear but that we can in fact rely on energy efficiency and sustainable energy. And if there is anything that I think the disaster in the Gulf should remind us, it is that technology as risky as offshore drilling or in fact nuclear cannot be 99.9 percent safe. That is not good enough. And I think there are other ways to address our energy needs.

Vermont is a leader in the Nation on energy efficiency. For 3 consecutive years—and I want to underline this point, and I hope my colleagues hear this—we have reduced our electricity consumption thanks to cost effective energy efficiency, and our people don't live in caves. Our economy is quite as robust, or not robust given the recession, as any other economy.

In Burlington, where I was Mayor from 1981 to 1989, we now have a lower unemployment than we do nationally. And today we use—and I want to underline this point, Mr. Chairman—in Burlington, Vermont, we use only 1 percent more electricity today than we did in 1989. And Burlington is a normal functioning city.

And let me put this hearing in the proper context. If over the next 10 years every State in the Union cut their electric consumption by 1.5 percent per year, a rate slightly less aggressive than what Vermont achieves today, we could by 2020, according to analysis by the American Council for an Energy Efficiency Economy, reduce peak electric demand by 117,000 megawatts, 117,000 megawatts. That would save—and I want my colleagues to hear this—more power than the entire capacity of the existing United States nuclear power plant fleet. How is that? That is what energy efficiency could do, and would save consumers \$168 billion on their bills while creating hundreds and hundreds of thousands of new jobs.

Now, I know there are disagreements in this Committee about the importance of nuclear, about what we should do in the future. I would argue, and I think we have charts here to show this, that if you want new energy creation in the United States, you know what? Nuclear is the most expensive way to go, the most expensive way to go. You want to build new power? Go to solar. Go to wind. Go to geothermal. Do not go to nuclear.

And I would just conclude by simply saying this, and I am not a fear monger here, but I would argue that if people are so pro-nuclear, they may want to volunteer to replace Yucca Mountain.

The people of Nevada have spoken pretty clearly through their Democratic and Republican Senators here. They don't want the waste. And I don't know if Tennessee wants the waste. I don't know if Ohio wants the waste. I don't know if Oklahoma wants the waste, but you may stand up and say you want a Yucca Mountain in your State.

But we have not solved the waste problem. You are looking at an expensive form of technology, and I worry about the safety hazards, and there are cheaper and more effective ways to go forward to solve our energy crisis.

Thank you very much, Mr. Chairman.

Senator CARPER. Thank you very much. We could probably debate these issues for a while, but the purpose of the hearing is to hear from our witnesses and have a good conversation with all of you. While we may not agree entirely on this panel on the role of nuclear energy and the future of nuclear energy in this country, I think maybe we do agree that the cleanest, most affordable form of energy is the energy we never use.

So that I think will unite us, and with that having been said, I again will call on Chairman Jaczko to be out lead-off hitter as the Chair. We will ask you to keep your comments to about 5 minutes, please, and then you will be succeeded by Commissioner Svinicki, by Commissioner Apostolakis, by Commissioner Magwood, and by Commissioner Ostendorff.

So I think the Chairman is going to take about 5 minutes. I would ask the other Commissioners to take about 3 minutes. And if you run a little bit over that, that is OK. If you run a lot over that, that is not OK, so we will rein you back in.

Chairman Jaczko, please proceed. Your entire statement will be made part of the record. Please proceed.

STATEMENT OF HON. GREGORY B. JACZKO, CHAIRMAN, U.S. NUCLEAR REGULATORY COMMISSION

Mr. JACZKO. Thank you, Mr. Chairman. Good morning to you and to the other Members of the Subcommittee.

The Commission, including my colleagues, Commissioners Svinicki, Apostolakis, Magwood and Ostendorff, is pleased to appear before you today. And I want to thank the Subcommittee as well as the full Committee for your support and leadership in the recent confirmations of our new Commissioners.

With the benefit of their added expertise and insights, the Commission stands fully prepared to continue to vigorously advance the NRC's mission of protecting public health and safety, ensuring the common defense and security, and protecting the environment.

The agency's critical mission entails broad responsibilities. We currently license, inspect and assess the performance of 104 operating nuclear power plants as well as many fuel cycle facilities and research and test reactors. Furthermore, nuclear materials are in use at thousands of hospitals, universities and other locations around the country.

The NRC staff, which provides oversight of our licensees, is now nearly 4,000 employees strong. And the Commission is continually impressed by the staff's expertise, experience and commitment to public service.

The NRC team has remained united by a common set of organizational values and principles of good regulation, as the Chairman stated in his remarks. Those values and principles guide the NRC in accomplishing its mission, engaging the public, licensees and other stakeholders openly and transparently, and pursuing excellence in all aspects of the NRC's work.

The last few years has been a time of dramatic change for the agency, during which the number of NRC employees has grown by more than 25 percent and the size of the NRC budget has increased by more than 50 percent. To accommodate this growth and reconsolidate the headquarters staff, construction will soon begin on the NRC's new 14 story office building adjacent to our current headquarters. This would not have been possible without the support of this Subcommittee, so I want to personally thank you, Mr. Chairman, Senator Voinovich, and the other members of the Subcommittee for providing the support to accomplish that significant milestone.

To maintain the agency's strong oversight programs, the NRC is focused on making progress on longstanding technical issues and safety issues as well as addressing emerging issues in a proactive and effective way. In recent months age-related degradation has attracted widespread public attention in the context of buried piping and tritium. This is a public confidence issue that requires that both the NRC and licensees continually listen to people's concerns and effectively communicate what the risks are and what is being done in response to these leaks.

The agency has also not lost sight of its critical security mission. A major power reactor security rule went into effect in March of this year that addresses issues such as physical barriers and detection and assessment systems.

The NRC has also worked collaboratively with the Federal Energy Regulatory Commission to coordinate our roles and responsibilities for implementing cybersecurity requirements.

The agency is also committed, consistent with our principles of good regulation, to ensuring that any new reactors are licensed, constructed and operated in accordance with the NRC's safety, security and environmental regulations. At the present time, the agency is actively reviewing 13 combined license applications for 22 new reactors under the Part 52 licensing process.

By 2012 the NRC may be approaching a final decision on the first combined license application for new reactors, as well as making final decisions about the operation of the Watts Bar Unit 2 nuclear power reactor.

The Commission is fully confident that the agency can successfully and effectively meet its regulatory responsibilities with regard to these matters, and do it in a way that is consistent with the principles of good regulation.

One need look no further than the NRC's existing licensing processes to see that the agency knows how to do licensing reviews. We complete approximately 1,500 reactor licensing actions and tasks per year.

The agency is also actively preparing for the licensing and other regulatory work related to the advanced generation of reactors,

such as the small modular reactor which Senator Voinovich referred to.

And finally, the NRC has also seen greater interest in the construction of uranium recovery and enrichment facilities. The agency has a strong regulatory framework in place for ensuring that these facilities are constructed, operated and decommissioned in a safe, secure and environmentally sensitive manner.

The significant issues that I have discussed today make it all the more important that the NRC continue to advance its mission in an open and transparent way, and the Commission is committing to doing so.

Over the past few months, the NRC has moved forward with implementing the President's Open Government Directive. Greater openness and transparency, I believe, will build public confidence in the agency by highlighting the agency's strengths, the experience, expertise and dedication of the NRC staff, and the vitality of the members on the Commission itself.

So on behalf of my fellow Commissioners, thank you for the opportunity to appear before the Subcommittee. We look forward to continuing to work with you to advance the NRC's important mission of protecting public health and safety and the environment.

And we would be pleased to respond to any questions that the Subcommittee may have.

Thank you.

[The prepared statement of Mr. Jaczko follows:]

**WRITTEN TESTIMONY
OF GREGORY B. JACZKO, CHAIRMAN
UNITED STATES NUCLEAR REGULATORY COMMISSION
TO THE
SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
SUBCOMMITTEE ON CLEAN AIR AND NUCLEAR SAFETY**

MAY 5, 2010

Good morning Mr. Chairman, Senator Vitter, and distinguished members of the Subcommittee. The Commission, including my colleagues Commissioner Svinicki, Commissioner Apostolakis, Commissioner Magwood, and Commissioner Ostendorff, is pleased to appear before you today to discuss the Nuclear Regulatory Commission's (NRC) oversight of operating reactors and licensing of new reactors.

I first want to thank you Mr. Chairman, Senator Vitter, and the Subcommittee for your support and leadership in the recent confirmations of Commissioner Apostolakis, Commissioner Magwood, and Commissioner Ostendorff. With the benefit of their expertise and insights, along with Commissioner Svinicki's experience, the Commission stands fully prepared to continue to vigorously advance the NRC's mission of protecting the public health and safety, promoting the common defense and security, and protecting the environment.

That critical mission entails broad responsibilities for the agency. The NRC currently licenses, inspects, and assesses the performance of 104 operating nuclear power plants, as well as many fuel cycle facilities and research and test reactors. Furthermore, nuclear materials are in use at thousands of hospitals, universities, and other locations around the country. Each of these facilities and materials users presents different challenges for the NRC and requires that the NRC develop and sustain a diverse array of regulatory capabilities. The Commission cannot give enough credit for the NRC's effectiveness as a regulator to the NRC's hard-working,

talented, and dedicated staff. The Commission is continually impressed by their expertise, experience, and commitment to public service.

The NRC is now nearly 4,000 employees strong. As the agency has grown, the NRC team has remained united by a common set of organizational values and principles of good regulation. Those values and principles continue to guide the agency in advancing its important safety, security, and environmental mission. Those values guide the NRC in maintaining its independence in accomplishing its mission, engaging the public, licensees, and other stakeholders openly and transparently, and pursuing excellence in all aspects of the NRC's work. The Commission believes the NRC's historic values and principles are vital to the NRC's ability to serve as a strong and effective safety regulator. These values and principles have been especially important during the last few years – a time of dramatic change for the agency – in helping sustain our focus and effectiveness.

During the past five years alone, the number of NRC employees has grown by more than 25 percent, the size of the NRC budget has increased by more than 50 percent, and two new offices have been created within the agency. To accommodate this growth and reconsolidate the headquarters staff, construction will soon begin on the NRC's new 14-story office building adjacent to the agency's Rockville headquarters. This dramatic growth in staff and resources was necessary to maintain the NRC's ability to address significant changes in the agency's regulatory landscape, including the review of a large number of new reactor applications.

None of this would have been possible without the support of this Subcommittee. I want to thank you Mr. Chairman, Senator Vitter, Senator Voinovich, and the other Members of the Subcommittee for providing that support. Your efforts have enabled the NRC to maintain its critical focus on the safety of operating reactors, while effectively meeting the additional

regulatory workload associated with the sustained high interest in safe license renewals for operating reactors and additional interest in certifying designs and licensing new reactors.

First and foremost, the focus of the NRC has remained, and will continue to remain, on the safety and security of operating reactors and nuclear materials. The NRC performs continuous oversight activities through its Reactor Oversight Process (ROP) to verify that the 104 currently licensed reactors are operating safely and securely in accordance with the NRC's regulations. This risk-informed and performance-based oversight approach relies on inspection findings and performance indicators to assess the performance of the plants. Although the ROP is a highly effective oversight tool, the NRC is always focused on improving its effectiveness. Last year, the NRC completed a biennial review of the ROP baseline inspection program to ensure that the ROP continues to focus and align resources on the most appropriate areas of reactor safety. Additionally, the NRC held a public meeting earlier this month to begin a discussion with the public and stakeholders on the potential for changes to the performance indicators in the ROP. This past week, the Commission also held a meeting to discuss the development of a more risk-informed, performance-based approach to the agency's oversight of fuel cycle facilities.

In the materials area, the NRC and the Agreement States oversee a wide variety of licensees that use radioactive materials for industrial applications, basic and applied research, manufacturing, and medical purposes. The NRC works hard to ensure that its licensees are using these materials in a manner that protects public health and safety and the environment. That work includes guidance and rules for licensees, as well as effective oversight and enforcement programs to ensure compliance. As the Subcommittee may be aware, in March 2010, the NRC proposed a \$227,500 fine against the U.S. Department of Veterans Affairs for violations of NRC regulations associated with an unprecedented number of medical errors involving treatment of prostate cancer patients at the Philadelphia Veterans Affairs Medical

Center. This is one of the largest fines the NRC has ever assessed against a medical licensee, and the licensee did not contest the fine. The NRC remains committed to ensuring that all patients, including veterans, are not exposed to radiation in violation of NRC regulations. To that end, the NRC is evaluating the program to see what improvements may be needed.

These types of oversight activities are critical to the NRC's effectiveness as a regulator. To maintain strong oversight programs, the NRC is focused on making progress on long-standing issues, as well as addressing emerging issues in a pro-active and effective way. Given the growth of the NRC's regulatory workload in recent years, these efforts are especially important for ensuring that the NRC remains an effective regulator.

Fire protection and emergency core cooling system sump performance are two significant long-standing issues on which the NRC is currently focused. The Commission's policy on fire protection is clear: the "staff should continue to encourage licensees to voluntarily transition to National Fire Protection Association Standard (NFPA) 805." As a risk-informed, performance-based approach, NFPA 805 allows licensees to undertake a comprehensive evaluation of their fire safety measures and focus their attention on design and operational issues according to their safety significance. Fifty plants have voluntarily opted to shift to NFPA 805. Two plants, Oconee and Shearon Harris, volunteered to be pilot plants for the transition to NFPA 805. The Shearon Harris pilot is nearing completion, and the Oconee pilot also expects to finish later this year. The path towards improving fire protection has been challenging at times, but the NRC and its licensees are making progress.

A second important issue on which the Commission intends to achieve closure in the near future is Generic Safety Issue-191 (GSI-191), which seeks to address the possibility that debris generated during a loss-of-coolant accident would clog the emergency core cooling system sump screens in pressurized water reactors. Like fire protection, GSI-191 has

presented challenges, but the agency has taken significant steps to address this issue among operating reactors and in new reactor designs. At the present time, 38 out of 69 pressurized water reactors have resolved their sump performance issues, with the exception of in-vessel effects. The Commission recently held a meeting to discuss the status of efforts to resolve this issue and will continue to remain engaged with the staff and licensees on this matter.

Even as the agency works on these long-standing issues, the NRC also will remain committed to addressing emerging issues in a pro-active and effective manner. Two such issues are age-related degradation and cyber security.

The NRC strives to maintain a sound understanding of the effect of age-related degradation on power reactor structures, systems, and components to ensure that they continue to meet their required safety performance. This research has taken on added significance in recent years as the NRC has received, and expects to continue to receive, license renewal requests that extend a reactor's authorized operation beyond its original 40-year term.

In recent months, age-related degradation has attracted widespread public attention in the context of buried piping and tritium leaks. The leaks have not exceeded the limits the NRC sets to ensure public health and safety, nor have the leaks interfered with the proper functioning of the plants' safety systems. But the public continues to ask— what is leaking, where is it leaking, how much is leaking, and what is being done to stop the leaking and to prevent it from happening again in the future? This is a public confidence issue that requires that both the NRC and licensees continually listen to people's concerns, and effectively communicate what the risks are and what is being done in response to the leaks. The Commission considers it a priority to fully inform the public and promote understanding of these issues. Toward that end, the NRC held public forums last month in Vermont and in the Washington, DC area to discuss

this matter. Be assured that the NRC will continue to engage the public to provide assurances that the NRC is working to protect public health and safety.

To further address these issues, the agency recently established a Groundwater Contamination Task Force to reevaluate the agency's actions in response to recent tritium incidents, as well as the staff's response to recommendations made in the 2006 Liquid Radioactive Release Lessons Learned Task Force Final Report. Also, the staff is actively participating in American Society of Mechanical Engineers Code and NACE International (formerly the National Association of Corrosion Engineers) standards activities to determine whether corrosion protection standards need to be enhanced.

As the agency stays on top of the potential safety issues related to aging facilities, the NRC has not lost sight of its critical security mission. A major power reactor security rule went into effect in March of this year that addresses issues such as physical barriers and detection and assessment systems. Although some licensees requested and were granted extensions to the compliance date for limited aspects of the new rule, the implementation of this rule furthers the agency's efforts to update security requirements. The NRC is keenly aware of the dynamic threat environment. The cyber threat, in particular, evolves quickly and requires that the agency maintain a consistent focus to evaluate the risks that it poses and how the NRC and its licensees can best guard against it. The NRC has worked collaboratively with the Federal Energy Regulatory Commission (FERC) to coordinate our roles and responsibilities in implementing our respective cyber security requirements. FERC and the North American Electric Reliability Corporation (NERC) have made progress on a Memorandum of Understanding to coordinate inspections on the cyber issue. This situation could be improved with statutory change to clarify that NERC can reimburse NRC for cyber security inspections.

Additionally, this past year, the Commission finalized a new cyber security rule, which requires that licensed nuclear power plants, as well as applicants for operating licenses, develop and submit for NRC review individual cyber security plans. To assist with the implementation of this rule, the staff has completed work on an associated regulatory guide, and continues to make progress in reviewing licensee plans. In addition to the Commission's other efforts to continue to update its security-related requirements, this cyber security rule is an indication of the significant progress the NRC has made in strengthening the agency's security regulatory framework.

The rulemaking and oversight work discussed to this point are very important to meeting the agency's safety and security objectives. The NRC continually works to strengthen its rules, update its guidance, and enhance its inspection and enforcement programs to meet the agency's safety mission. But the NRC cannot be everywhere, and it cannot inspect everything. It is the responsibility of the licensees who have day-to-day control over the functioning of the plant and have the responsibility to develop and maintain a positive safety culture that ensures that safety and security issues receive the attention they warrant.

Safety culture is an area that the NRC has increasingly focused on, in recent years, for the simple reason that the NRC has found that a deteriorating safety culture is associated with safety problems. The NRC has incorporated safety culture into the ROP and also has been working to develop a safety culture policy statement. The current draft statement makes clear that security is an important part of a positive safety culture and that safety culture is no less significant for material sites than for reactor facilities. The Commission recently held a meeting to discuss the draft statement after the public comment period closed. Throughout this process, the NRC has benefited from extensive public input by soliciting written comments and convening several public meetings on the issue. Over the next year, the Commission looks forward to working to finalize a statement that clarifies the NRC's expectations of its licensees and that helps the agency staff determine how best to promote safety culture.

Before moving on, I should emphasize that maintaining a strong safety culture within the agency is a priority for the NRC. The agency can take pride in the fact that the 2009 NRC Inspector General's Safety Culture Survey of NRC employees reported that the agency's safety culture and work climate scores are excellent and compare favorably with those of high-performing private-sector companies. Building upon this past success, the NRC has been working on implementing the follow-up actions to the Inspector General's findings, as well as the recommendations of the agency's Internal Safety Culture Task Force.

As these initiatives demonstrate, the Commission has maintained its focus on verifying that operating plants operate in line with the NRC's safety, security, and environmental requirements. The NRC's core mission objectives are no different in the context of new reactors. The agency is committed to ensuring that any new reactors that may be licensed, constructed, and operated would be done so in accordance with the NRC's safety, security, and environmental regulations.

By 2012, the NRC may be approaching a final decision on the first combined license (COL) applications for new reactors under the Part 52 licensing process. But that is far from the only new reactor licensing activity that the agency will be embarking upon. By 2012, the NRC also may be approaching a final decision on the operating license for the Watts Bar 2 reactor application under the original Part 50 licensing process. If its application is found to meet NRC requirements, Watts Bar 2 – a reactor that the Tennessee Valley Authority (TVA) started to construct in 1973, suspended construction on in 1985, and resumed construction on in 2007 – could be the first new reactor to start commercial operation since 1996. By 2012, in addition to these licensing activities, the NRC also expects to receive the first design certification request for a small modular reactor (SMR) utilizing technology similar to the current operating reactors. Subsequent SMR designs could employ reactor technologies other than the light-water technology that predominates among currently operating reactors.

Just ten years ago, few people inside or outside the NRC could have foreseen the breadth of major licensing activities now before the agency. The Commission is fully confident that the agency can successfully and effectively meet its regulatory responsibilities with regard to all of these matters. That confidence reflects the Commission's high regard for the hard work and dedication of the NRC staff and their strong track record in conducting efficient, predictable, and thorough licensing reviews.

One need look no further than NRC's existing licensing processes to see that the agency knows how to do this type of work. The NRC completes approximately 1500 reactor licensing actions and tasks per year. In addition to conducting reviews effectively and efficiently, the NRC has historically demonstrated its ability to adjust to changing circumstances, as shown when the agency developed new capabilities to review power reactor license renewal and power uprate applications.

At the present time, the NRC is actively reviewing 13 combined license (COL) applications for 22 new reactors under the Part 52 licensing process. The Commission originally envisioned that vendors would apply for certification of standardized designs, and that applicants would then proceed sequentially through the review process for a COL. Due to a number of factors, the anticipated sequential Part 52 process has not worked that way, but the NRC has done an effective job in concurrently reviewing design certification requests and reactor COL applications.

The agency's strong work in this area was recently recognized by the Bipartisan Policy Center (BPC). Under the leadership of former Senator Pete Domenici and former NRC Chairman Richard Meserve, the BPC assessment confirmed the high-quality work of the NRC staff in conducting thorough and timely reviews of license applications. In keeping with the agency's strong commitment to continuous improvement, the NRC will implement the BPC's

recommendation to conduct a lessons-learned review of the Part 52 licensing process. The NRC staff will proceed with this review after the first COL review has been completed, which may include recommended policy proposals for Commission consideration to further enhance the licensing process for future applications.

As the agency approaches final decisions on the first COL applications, the Commission will seek to complete its update of the waste confidence rule. The NRC staff has taken a fresh look at the technical basis for the agency's waste confidence findings and has reaffirmed that spent nuclear fuel in any reactor can be safely stored, without a significant impact to the environment, for at least 60 years after the licensed life of operation. The Commission has this draft final rule in front of it now. This will be an important issue for the Commission to resolve soon.

As the staff completes the final safety reviews on the first COL applications, the Commission also will focus attention on preparing for the mandatory hearings required under the Atomic Energy Act. Back in 2007, the Commission committed to conducting the mandatory hearings, rather than to continue to have the Atomic Safety and Licensing Board Panels perform this function. Over the coming year, the Commission will prepare for the conduct of these hearings. The Commission is committed to making required safety, security, and environmental findings openly, fairly, and efficiently.

In addition to the agency's work related to the new reactor COL applications under review, the NRC is also actively preparing for the licensing and other regulatory work related to the advanced generation of reactors. In 2012 and 2013, the NRC expects to receive multiple applications for design certifications, early site permits, combined licenses, and manufacturing licenses for small modular reactors (SMRs). Additionally, the Next Generation Nuclear Plant (NGNP) program is expected to provide a design certification application to the NRC in 2012 or

2013. The NRC has been working closely with the Department of Energy to ensure that the agency will be ready to review this application.

In anticipation of these activities, the NRC established the Advanced Reactor Program within the Office of New Reactors to focus on preparing and conducting licensing reviews of SMRs. Since the NRC's existing regulations and guidance are focused on light-water reactors and may not necessarily translate to other technologies that might be employed by SMRs, the NRC is identifying and conducting necessary research, developing the needed analytical tools, and preparing appropriate review guidance for SMR-related licensing activities. The staff has also prepared a comprehensive paper on potential policy, licensing, and technical issues that may require Commission consideration in the future.

In addition to the increased interest in new reactors, the NRC also has seen greater interest in the construction of uranium recovery and enrichment facilities. The agency has a strong regulatory framework in place for ensuring that uranium recovery and enrichment facilities are constructed, operated, and decommissioned in a safe, secure, and environmentally sensitive manner. In anticipation of new applications, the agency has been working to strengthen the agency's review process. For example, in the area of in situ recovery (ISR) facilities – the type of uranium recovery that has probably generated the most interest over the last few years – the agency has sought to make its environmental review more efficient and effective. Specifically, the agency has prepared a Generic Environmental Impact Statement (GEIS) to serve as a starting point for the site-specific environmental reviews for these applications. By addressing common environmental issues associated with these facilities, the GEIS helps avoid duplication in analyses and allows the staff to stay focused on conducting thorough site-specific reviews. To ensure that the site-specific review addresses all of the applicable environmental issues, the NRC is conducting a Supplemental Environmental Impact Statement for each proposed site.

The significant issues that I have discussed today make it all the more important that NRC continue to advance its mission in an open and transparent way and the Commission is committed to doing so. For example, over the past few months, the NRC has moved forward with implementing the President's Open Government Directive. As an independent agency, the NRC was not required to comply with this Directive, but the agency has done so because it is consistent with the NRC's historic organizational commitment to openness and transparency. Furthermore, the NRC staff has done consistently good work in reaching out to the public and to stakeholders in developing new regulatory implementation guidance and other related work. Greater openness and transparency will only build public confidence in the agency by highlighting the agency's strengths: the experience, expertise, and dedication of the NRC staff, as well as the vitality of the Commission.

Mr. Chairman, Senator Vitter, and members of the Subcommittee, on behalf of my fellow Commissioners, thank you again for the opportunity to appear before the Subcommittee. We look forward to continuing to work with you to advance the NRC's important public safety mission. We would be pleased to respond to any questions that the Subcommittee may have. Thank you.

Senate Environment and Public Works Committee Hearing**May 5, 2010****Follow-Up Questions for Written Submission****Senator Barbara Boxer**

- 1. I understand you have been working to bring greater transparency to deliberations and decision making at the Nuclear Regulatory Commission. Can you describe what actions you have taken and how they are working?**

Deliberations among the Commission are going well. The NRC has been, and continues to be, a very open and transparent agency. Even still, we continue to look for ways to bring even more transparency to our practice. Notably, new technologies create more potential than ever before for enhancing agency transparency, including enhancements to online document databases, webstreaming of meetings, and information available via the agency Website. Further information on NRC transparency efforts can be found at the NRC's Open Government Web page (www.nrc.gov/open) and in the NRC's Open Government Plan, which is accessible from that Web page. As an independent agency, the NRC was not required to comply with the President's Open Government Directive, but the agency has done so because it is consistent with the NRC's historic organizational commitment to openness and transparency.

The Commission is committed to making decisions in as open a manner as possible and will continue to maintain a decision-making process that allows a free exchange of ideas and fosters well-considered decisions. The Commission continues to look for additional ways to further enhance our decision-making and transparency.

2. **The Bipartisan Policy Center presented testimony which said that their review of the NRC's licensing process found that the NRC had not "needlessly delayed or extended the licensing process." Do you agree with the BPC's findings? Are additional changes to the NRC licensing process necessary at this time?**

The Commission agrees with the Bipartisan Policy Center's (BPC) conclusion that the NRC has not needlessly extended the licensing process. The BPC assessment confirmed the high-quality work of the NRC staff as safety regulators in conducting thorough and timely reviews of license applications. In keeping with the agency's strong commitment to continuous improvement, the NRC will implement the BPC's recommendation to conduct a lessons-learned review after the first COL review has been completed, which may include recommended policy proposals for Commission consideration to further enhance the licensing process for future applications. Until the first combined license has been issued and the staff review completed, it would not be prudent to make major changes to the existing licensing review process. In the meantime, the NRC will continue to conduct licensing activities in an open and transparent manner that focuses on safety and interact with the stakeholders to obtain feedback. Specifically, the NRC continues to enhance the staff's implementation of the licensing process for new reactors to increase the effectiveness, efficiency, and predictability of licensing, while maintaining the NRC's focus on safety and security. These activities include updating key guidance documents for NRC activities and application preparation, developing strategies and work products for optimizing the review of applications received, developing a construction inspection program for new construction activities, and continuing activities in the pre-application and design certification review processes. These actions should help obviate any potential misunderstandings between the NRC, the applicant, and other stakeholders, and ensure that unnecessary delays do not occur during the new reactor licensing process. At this time, the NRC does not believe that changes to its regulations for new reactor licensing are necessary.

Senator Thomas R. Carper

- 1. I understand that the Department of Energy and industry are collaborating with NRC on research related to extending nuclear reactor operations beyond 60 year timeframes. Extensions make a great deal of economic sense for utilities given that current plants are operating at high capacity factors and efficiencies. What are NRC's plans to ensure the safe long-term operations of nuclear plants in the future?**

The NRC continues to ensure the safe long-term operation of nuclear power plants through the NRC's comprehensive set of regulations, inspections, and safety review programs. The NRC also has a comprehensive inspection program that continually monitors and evaluates the performance of nuclear power plants. The NRC also performs extensive reviews of each license renewal application, a process that can currently allow reactors to operate for up to 60 years. In particular, these reviews focus on each license renewal applicant's aging management programs. In addition, the NRC inspects each applicant's implementation of its quality assurance program and aging management programs.

With respect to the potential for license renewal for operation beyond 60 years, it is the responsibility of the applicants and the industry to demonstrate through research and engineering activities that an applicant can safely manage the effects of aging on structures, systems and components that are within the scope of license renewal. While our priority must remain ensuring comprehensive reviews for first-time renewals, the NRC will prepare for the possibility of subsequent license renewal applications to take reactors beyond 60 years of operation. Therefore, to provide an evaluation of the feasibility of subsequent license renewal applications, the NRC has initiated research activities that will review operating experience and industry research to address aging management technical issues, expand materials degradation assessment to verify current assumptions, assess results from the implementation of the current license renewal aging management programs, and develop domestic and international partnerships to exchange information related to aging management research.

- 2. With the growing nuclear workforce demands at NRC and those projected nationally, what can NRC do to support workforce development programs to ensure that the U.S. has the technical wherewithal to maintain a safe and competitive nuclear industry in the future? Could you update us on the status of the NRC university grants program?**

During the past five years, the number of NRC employees has grown by more than 25 percent. This dramatic growth in staff and resources was necessary to maintain the agency's ability to address significant changes in the agency's regulatory landscape, including the review of new reactor applications. The agency's workforce challenges now include retaining our talent and continuing our strong knowledge management programs to ensure that newer staff benefit from the experiences of the veteran NRC staff.

The NRC nuclear education program provides grants for curriculum development, faculty development, undergraduate and graduate student scholarships, and fellowships in nuclear-related fields, including nuclear engineering, health physics, radiochemistry, and related fields where demand for skilled individuals far outpaces supply. Each year approximately 500 students and 60 faculty members involved in these disciplines benefit from the NRC nuclear education program grants. A unique aspect of the NRC program is that it provides additional support to community colleges and trade schools through the trade school/community college scholarship program.

In 2010, the NRC provided \$20 million for 96 grants to institutions in 30 states and Puerto Rico. All trade school and community college applications received funding. Of the \$20 million, \$5 million is designated for NRC's contribution to the Integrated University Program. Per statute, this program's funds are coordinated among, and awarded through the NRC, DOE, and the National Nuclear Security Administration to support multi-year research projects that do not align with the NRC's programmatic mission, but which are critical to maintaining nuclear engineering and science that contribute to the availability of a highly skilled technical workforce for the nuclear industry.

- 3. Regarding the principles of good regulation, our utility speaker from Panel II, Mr. Vanderhayden, would like to see annual stakeholder reviews of how NRC is meeting the principles. What do you think, is this a good idea?**

When NRC licensees or other stakeholders offer input about the NRC's performance, we would welcome their feedback. As Mr. Vanderhayden noted, NRC currently solicits external views in a number of ways. For example, NRC uses Reactor Oversight Process (ROP) surveys, monthly public meetings, and hosts special meetings to discuss particular issues. The agency also offers yearly meetings in the vicinity of each operating reactor to discuss the results of our assessment of the licensee's performance and participates in a number of workshops during the annual Regulatory Information Conference as well as many other technical and international conferences where feedback from our stakeholders can be obtained.

4. Openness has rightfully been a key priority of the NRC. However, what do you believe is the appropriate level of openness related to voting deliberations?

The Commission is committed to making decisions in as open a manner as possible, and will continue to maintain a decision-making process that allows a free exchange of ideas and fosters well-considered decisions. Recent public Commission meetings have included substantive discussions and policy debates among Commissioners, as well as productive dialogues with NRC staff and stakeholders that are valuable in informing the Commission's deliberations. The Commission continues to look for additional ways to further enhance our decision-making and transparency.

5. What are the NRC's target timelines for processing license renewal applications? Are there any license renewals that are behind the NRC's target timelines? If so, what is the status of those applications and what are the Commission's plans to complete review of those applications with reasonable expedition? How is the NRC communicating the status of these applications to the applicants?

- **Regarding the current fleet of reactors, how many licensing issues are pending before Commission? Do guidelines or timelines for decisions on such pending actions exist? If so, are the applications being reviewed and decisions rendered per the anticipated timelines? If not, can you comment, in each instance, on why such target timelines are not being met and when a decision might be expected on each of these actions? What would the Commission need in order to provide greater predictability in this regulatory process?**

The NRC has two milestones for the timely review of license renewal applications. It is expected that the NRC will complete its review of the application within 30 months from receipt if a hearing is required or within 22 months from receipt if no hearing is required. The NRC has already renewed licenses for 59 of the 104 nuclear reactors operating in the United States. The NRC is currently reviewing 14 applications (including one submitted June 1, 2010 for the Seabrook station) for 20 units.

The 30-month target timeline has been exceeded on the contested license renewal applications relating to the Vermont Yankee, Pilgrim, and Indian Point operating reactors. This has occurred because of the complexity of issues and the interests of the parties. Although this target timeline has been exceeded on the contested license renewal applications for these three plants, they continue to operate under their existing licenses. Under the NRC's regulations, a licensee - if it is timely in the submittal of its renewal application - is authorized to continue to operate in accordance with its existing license during the pendency of the renewal application review. The communication of any hearing delays to all adjudicatory hearing parties is an integral part of case management conferences, scheduling notices, and status reports. In addition, the NRC posts on its public web page the status of license renewal applications and related industry activities.

The time needed for the Commission's consideration and resolution of adjudicatory matters is informed by a number of factors, including the nature of the legal and/or factual issues that must be decided. These issues may vary widely not only in number, but also in legal

and technical complexity, the procedural posture of the case, and the scope of the underlying record to be considered. In addition, these matters must be prioritized, taking into account other pending adjudications and the balance of the Commission's considerable workload – the adjudication of legal matters is only one of the Commission's many responsibilities. Considering the number of factors that inform its schedule, it is difficult for the Commission to provide precision in the timeline for Commission review in adjudicatory matters.

The following adjudicatory actions involving license renewal applications are pending before the Commission:

Pilgrim License Renewal Proceeding

1. Licensing Board Referred Ruling: Decision (Denying Motion on Behalf of Pilgrim Watch for My Self-Disqualification from the Remand Proceedings and Referring Motion to the Commission (June 10, 2010) (unpublished)

Prairie Island License Renewal Proceeding

2. Northern States Power Company's Petition for Interlocutory Review of an Order Admitting a Safety Culture Contention (February 12, 2010)
3. NRC Staff's Petition for Interlocutory Review of Atomic Safety and Licensing Board Decision Admitting Late-filed and Out of Scope Safety Culture Contention (February 12, 2010)

Senator Sheldon Whitehouse

1. Officials from the NRC have stated that due to a blocked drain within the underground pipe encasing where the leaking pipe was located, employees at Entergy's Vermont Yankee nuclear power plant were delayed in detecting the tritium leak source even once an elevated concentration of the substance was observed in a monitoring well. While flow through the drain is apparently one mechanism for monitoring leaks, it seems reasonable for these pipe encasings to include at least one backup monitoring system, so that radioactive leak locations can be precisely identified and stopped before the dangerous substances mingle with the groundwater and move beyond plant boundaries.

First, has the reason for the drain blockage been identified and addressed?

Second, are there technologies already available, aside from drains prone to clogging, which would have allowed Vermont Yankee employees to more quickly pinpoint the presence of a leak? If so, why were those technologies not employed?

If such technologies do not exist, what steps are the NRC and industry taking to improve monitoring technologies, especially in inaccessible pipe encasings? Are technologies available or in development that might allow monitoring of flow through the pipes themselves? When such new technologies are developed, will they be required either for re-licensing or for first-time licensure, or both?

Finally, should new standards be adopted that provide for easier technician access, and therefore easier monitoring and repair, of underground pipes? In terms of its voluntary monitoring initiative, does the industry have plans to respond to the Vermont Yankee incident by changing or improving standards?

Yes, the reason for the drain blockage has been identified and addressed. Upon excavation of the Advanced Offgas System (AOG) pipe tunnel and adjoining structures in February 2010, Entergy determined that the AOG pipe tunnel floor drain was obstructed by construction debris. The debris was subsequently removed resulting in the normal functioning of the floor drain, and thus effectively stopping the flow of contaminated water to the ground. Additionally, Entergy completed repairs that stopped the leakage from the affected piping in the AOG pipe tunnel, and established a monitoring device on the AOG drain pit sump pump. Currently, there is no active leakage in the AOG pipe tunnel, drainage from the AOG pipe tunnel floor drain is unimpeded, and the source of groundwater contamination has been stopped.

There are a number of technologies for detection or removal of fluid that inadvertently accumulates or otherwise leaks into a space. Use of combinations of these technologies may have permitted Vermont Yankee employees to more quickly pinpoint the presence of a leak. Besides drains, examples of simple technologies include dipsticks, floats, and sight glasses. In addition to these simple types of level indicators, a variety of electronic detectors, such as heated-junction thermocouples, piezoelectric transducers, and conductivity probes, are commonly employed for remote level detection or detection of accumulated water.

Because the vault at Vermont Yankee did not perform a safety function, NRC regulations do not require diverse means to drain water from the vault or require level monitoring technology. According to NRC regulations, safety related equipment, structures, systems, and components are those relied on to remain functional during design basis events to ensure: 1) the integrity of the reactor coolant pressure boundary, 2) the capability to shut down the reactor and maintain it in a safe shutdown condition, or 3) the capability to prevent or mitigate the consequences of certain accidents. Controls and means to limit radioactive effluents from safety and non-safety related equipment, structures, systems, and components are part of the application and part of the licensing basis of operating reactors. The Commission's regulations require that licensees control and limit radioactive effluents from safety and non-safety related sources within the limits set forth in 10 CFR Part 20. For non-safety-related systems, standard engineering practices and compliance with applicable building and construction codes would permit latitude in the selection of any drain or drain failure monitoring systems. NRC regulations and rules are not prescriptive on this point.

There are a variety of common, mature technologies available for measuring flow through piping. These technologies are commonly employed in nuclear power plants and many industrial applications. A very simple example is a gasoline pump, where the volume of gasoline dispensed is required to be accurately measured. The gasoline pump employs a mechanical flow meter to measure the volume of gasoline dispensed. Other types of flow meters include orifice plates, venture tubes, calorimetric and turbine flow meters, electromagnetic, ultrasonic Doppler, and positive displacement.

There are other leak detection techniques used in a variety of industrial and infrastructure applications. Water companies and other industries that use buried or underground piping use audio techniques to listen for leaks and then use multiple transducers to triangulate the suspected flaw location to find leaks. This technology can be difficult to use successfully in the noisy environs of a power plant. For underground piping in vaults, it is possible to install volume

monitors that can provide indication of leaks. For example, installation of a humidity monitor in a vault that carries a steam pipe is an effective means of determining whether a steam leak is present.

The NRC currently has regulations that require monitoring for leakage from the primary system at nuclear power plants. The primary system contains potentially highly radioactive liquid. None of this piping is buried or underground; it is all located inside the containment structure. The NRC regulations generally do not require monitoring for small leaks in non-safety related piping. Instead, non-safety related systems must be designed and operated such that doses to workers and the public are as low as reasonably achievable and do not exceed regulatory limits in 10 CFR Part 20. The NRC continues to evaluate its regulations in light of operating experience and advances in technology.

For new reactors, the NRC has regulations that require a description of how the facility's design and procedures for operation will minimize (to the extent practicable) contamination of the facility and environment, facilitate decommissioning, and minimize the generation of radioactive waste.

For existing reactors, NRC regulations include a "Backfit Rule," Title 10 of the Code of Federal Regulations, Part 50.109, describes the conditions through which the NRC imposes new requirements on reactor licensees. Briefly stated, for any NRC action that would result in modification of or addition to systems, structures, components, or design of the nuclear power plant, or the procedures or organization required to design, construct or operate a nuclear power plant, the NRC must conduct an analysis prior to imposing the change, unless the changes are necessary in order to: 1) to bring a facility into compliance with its license or the regulations, 2) to ensure a facility provides adequate protection to the health and safety of the public or is in accord with the common defense and security, or 3) to define or redefine what level of protection is considered adequate. The NRC can impose the change if it concludes through analysis that the backfit would achieve a substantial increase in the overall protection of the public health and safety or the common defense and security and that the direct and indirect costs of implementation for that facility are justified in view of this increased protection. To date, there has been no threat to public safety or public health from any leaks from buried or underground piping at any nuclear power plant. Based on the staff's review of operating experience related to buried piping degradation, current regulations have been effective in ensuring that the structural integrity and functionality of buried, safety-related piping are maintained.

The NRC created a Groundwater Contamination Task Force that was charged with identifying findings related to potential environmental effects of tritiated water leaking into groundwater. The Task Force report, which was issued on June 17, 2010, will be reviewed by a team of NRC senior managers to determine what, if any, recommendations might warrant policy change proposals for the Commission to consider in the future.

The industry has established a Buried Piping Integrity Initiative that requires its member nuclear plant licensees to adopt buried piping maintenance, monitoring, and repair programs, with the objective of preventing leaks. This voluntary initiative currently addresses only buried piping (piping in contact with soil), but the industry is considering expanding the initiative to address all underground assets, including buried piping and tanks, and underground piping in vaults and chases. Each plant is supposed to establish buried piping programs and procedures before July 2010, identify and rank each piping segment by January 2011, develop an inspection plan by June 2011, begin to implement the inspection plan by June 2012, and complete its assessment of all piping containing radioactive materials by June 2013. Additionally, this initiative asks its members to develop an asset management plan by December, 2013. The NRC will be evaluating the implementation of this voluntary initiative to determine whether it is effective in reducing the incidence of buried piping degradation.

Senator Tom Udall

The NRC is currently working on the license for the operation of the National Enrichment Facility under construction in Eunice, New Mexico, which is of great importance to Southeast New Mexico. I encourage the NRC to work transparently with the project developers and the community to ensure that the facility is safe for its start-up and throughout its operation. Given that this facility is the first major new nuclear facility constructed in the United States in some time, I have the following questions:

- 1. Is the NRC planning to perform any reviews/self assessments of the 10 CFR 50 or 10 CFR 70 combined licensing process in the near term to identify areas for process improvement?**

Since these questions were received, the NRC staff recently (on June 10, 2010) completed its readiness review of the Louisiana Energy Services gas centrifuge uranium enrichment plant and concluded that the facility can begin operation of the first cascade under its NRC license.

Most applications for new construction currently before the NRC for review come under 10 CFR Part 52 (Watts-Bar will be considered under Part 50). The NRC is always looking for improvement in its Part 52 regulatory process. Specifically, the NRC continues to modify the licensing process for new reactors to increase the effectiveness, efficiency, and predictability of licensing, while maintaining the NRC's focus on safety and security. These activities include updating key guidance documents for NRC activities and application preparation, developing strategies and work products for optimizing the review of applications received, developing a construction inspection program for new construction activities, and continuing activities in the pre-application and design certification review processes. The Bipartisan Policy Center's assessment confirmed the high-quality work of the NRC staff to date in conducting thorough and timely reviews of license applications under Part 52. The NRC will implement the BPC's recommendation to conduct a lessons-learned review after the first COL application review has been completed, which may include recommended policy proposals for Commission consideration to further enhance the license process for future applications.

Regarding 10 CFR Part 70, the NRC recently updated its Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility. This effort was focused on improving both the clarity and consistency of the NRC staff's reviews of applications to

determine compliance with current regulations. This revision also took into consideration lessons learned from the review of two enrichment plant license applications and incorporated information to better risk-inform preoperational readiness reviews. In addition, a self assessment is being conducted by the NRC's Region II staff regarding lessons learned from the implementation of the construction inspection program for two new enrichment plants, including the URENCO USA facility (formerly known as National Enrichment Facility). Finally, the NRC is conducting a self-assessment of the fuel facility licensing process that may identify additional areas for process improvement. Findings from these reviews will be considered for inclusion in future revisions of the Standard Review Plan and the inspection program.

2. If not, is such a review planned in the future?

See response to Question 1.

- 3. For both 10 CFR 50 and 10 CFR 70 facility combined licenses (COLs), is the NRC considering any changes to the COL process to further define the final stages that must be completed to go in to operations and how to address/resolve any conflicts regarding interpretations of the license that may arise between the NRC and licensee?**

With regard to new reactors, the NRC does not plan on considering any immediate changes in this area of the combined license process at this time. The NRC believes the current process is sufficiently robust. As discussed in response to your first question, the NRC will implement the BPC's recommendation to conduct a lessons learned review after the first COL application review has been completed.

With respect to the 10 CFR Part 70 licensees, the NRC has gained considerable experience in conducting construction inspections and operational readiness reviews at the URENCO USA facility (formerly known as National Enrichment facility). These inspections, which are specifically required by section 193 of the Atomic Energy Act of 1954, as amended, have been conducted in accordance with the NRC's Inspection Manual Chapter (IMC) 2696, "Louisiana Energy Services Gas Centrifuge Facility Construction and Pre-Operational Readiness Review Inspection Programs." Based upon the experience gained during the inspections conducted at the Urenco USA, the NRC staff responsible for the Part 70 program have been compiling recommendations for an update to the Inspection Manual. In addition, the staff plans to perform a comprehensive lessons-learned review later this summer and will consider the results for possible updating of the Inspection Manual or Standard Review Plan as appropriate.

In some cases, management intervention has been needed to resolve conflicts between the NRC and licensee interpretations of regulatory requirements. These instances have highlighted the need for early and frequent communication between the NRC and its applicants, particularly in new or complex areas. We encourage both staff and applicants to promptly elevate differences to management, as was done in the case of the staff's review of the Urenco application. Further, the NRC has a structured process for evaluating new or different agency positions regarding interpretation of regulatory requirements. This process is described in 10 CFR 50.109, "Backfitting," for reactors, and 10 CFR 70.76, "Backfitting," for fuel facilities. Implementation of this process is governed by NRC Management Directive 8.4, "Management of Facility-Specific Backfitting and Information Collection."

4. Is the NRC considering the adoption or development of processes to allow early plant construction prior to receipt of the license for 10 CFR 70 facilities as it has developed for 10 CFR 50 new plant construction?

The Commission is not currently considering a provision for Part 70 licenses that would permit construction of safety related components before a license is issued as is permitted under the limited work authorization rule for Part 50 licensees. However on June 22, 2010, the Commission approved for publication a proposed rulemaking that revises the definitions of "construction" and "commencement of construction" for materials applicants to resolve an inconsistency that currently exists between various parts of Title 10 of the CFR with regard to the definition of these terms. The proposed rule would enable applicants for materials licenses to engage in non-safety or non-security related site preparation activities not related to radiological health and safety or common defense and security considerations before issuance of a license without obtaining the NRC's approval. Such activities, which do not constitute early facility construction, could include clearing land, site grading, and erosion control, and construction of main access roadways, non-security related guardhouses, utilities, parking lots, or administrative buildings not used to process, handle, or store classified information.

Senator James M. Inhofe

1. **During the Opening remarks of the individual Commissioners, several -notably Commissioner Svinicki -cited the NRC's Principles of Good Regulation as an enduring and solid basis on which to base Agency actions and to assess effectiveness. Specifically, these Principles are said to be the Agency's guide to its decision-making and provide fundamental guidance on the quality of the Agency's regulatory actions and the correctness of its decision-making. Do the Commissioners believe that it would, therefore, be appropriate to include assessments of how each rulemaking and other major agency actions comport with the Principles of Good Regulation?**

The Commission believes that NRC's Values and Principles of Good Regulation are vital to the NRC's ability to serve as a strong and effective safety regulator. These values and principles continue to guide the agency in advancing its important safety, security, and environmental mission. However as broad statements of the NRC's aspirations, these were not designed as bases for regulatory assessments. But NRC's conformance with a multitude of administrative statutes and implementing regulations bolsters our ongoing efforts to comport with these values and principles. These continuing self-assessments include public comment reviews, safety reviews, Voluntary Consensus Standards reviews, environmental reviews under the National Environmental Policy Act, Paperwork Reduction Act reviews, regulatory analyses following OMB guidance, Regulatory Flexibility Act reviews, Plain Language in Government Writing, and backfitting. NRC's regular performance of these assessments guides the agency in its endeavors to comply with these values and principles and make informed regulatory decisions.

2. **I'm struggling to understand how the Commission can be "fully confident" that it will successfully meet its responsibilities for issuing new plant licenses, yet at the same time remain without any clear schedule to abide by after the staff completes its review of the applications. Unforeseen circumstances may require you to revise a schedule- that's just common sense-but they don't justify a failure to plan. I'd hate to see the NRC staff diligently meet their schedules only to have the NRC get a reputation as an unpredictable regulator because of delays resulting from the Commission's failure to manage the last portion of the process.**
 - a. **The NRC regulations provide milestones for the conduct of the hearings and the Commission has supervisory authority. The Commission exercised this authority in the LES license review for an enrichment plant in New Mexico: it directed the hearing board to follow a binding schedule. The hearing was completed within that time frame. Is there a reason to expect that new plant hearings can't be conducted in a similar, predictable way?**

The NRC Regulations in 10 CFR Part 2 Appendix B provides model milestones for the conduct of hearings. Hearings for the issuance of a combined license are typically conducted under Subpart L, and pursuant to the model milestones set forth in Section II of Appendix B. The model milestones provide a starting point to set detailed schedules based on all relevant information including the number of contentions admitted, the complexity of the issues, and the NRC staff's schedule for completion of its safety and environmental evaluations. Notably, an applicant or other party may bring any other relevant consideration to the attention of the presiding officer to support either an expedited or lengthened schedule. The licensing boards have considered the model milestones and other relevant information in setting their hearing schedules in the currently pending COL proceedings. The Commission expects that the licensing boards will adhere to the hearing procedures set forth in the regulation and comply with the Commission's policy statements on the conduct of adjudicatory proceedings. Further, the Commission retains its supervisory authority over the licensing boards and possesses the authority to take action in individual licensing proceedings, as appropriate, to provide guidance to the boards and decide issues to ensure the prompt and effective resolution of matters set for adjudication. Therefore, it is not necessary to direct the licensing boards in each proceeding to follow a prescribed schedule.

The Commission has decided that we – rather than the ASLB - will conduct the mandatory uncontested hearings associated with COL applications as required by Section 189 of the Atomic Energy Act. In the coming months, the Commission will finalize the process we will use to effectively and efficiently conduct these hearings in a timely manner. As part of this effort, the Commission will consider establishing milestones for completing mandatory hearings.

- b. Please list all reasons why the Commission can't estimate the time needed, following the issuance of final SER's and environmental reports, for the agency to issue COL's. Please indicate whether these factors are beyond the agency's ability to manage or not.**

As a general matter, it is difficult to estimate the time it will take to issue a combined license following the issuance of the Safety Evaluation Report and the final Environmental Impact Statement. Under the model milestones, any contested evidentiary hearing typically begins following the issuance of these documents. The length of the hearing is dependent on the number and complexity of the admitted contentions. In addition, new contentions may be filed based on new information introduced in the staff documents, potentially adding to the length of the hearing. Similarly, the length of the uncontested mandatory hearing is difficult to estimate until the scope and complexity of the issues to be considered are known. The Bipartisan Policy Center recommended legislative-style hearings, which is one of the options that the Commission is considering. While the agency closely manages the technical review and hearing schedules, there are some matters that are beyond the NRC's ability to manage, which can contribute significant uncertainty to the scheduled issuance of a COL. These include the vendor's completion of the certified design application, the completeness of any application for a certified design or combined license, and any applicant proposed amendments to its combined license application.

- c. Please explain how the agency will allocate personnel and resources in drafting its FY 2012 budget without timelines for completing work on the various applications.**

In preparing the budget each fiscal year, the agency reviews all planning information. This review includes estimates for the resources needed for anticipated hearings.

- d. **Please explain how this situation reflects adherence to your "Reliability" principle, especially how "Regulatory" actions should always be fully consistent with written regulations and should be promptly, fairly, and decisively administered so as to lend stability to the nuclear operational and planning processes."**

The NRC has established procedures and set milestones for the agency's review of a COL application: preparation of the SER and EIS, and the conduct of contested hearings. The Commission continues to seek ways to improve hearings processes, including those for uncontested mandatory hearings and plans to consider establishing milestones for conducting uncontested mandatory hearings in COL cases. As the preamble to the question observes, plans are must be flexible to account for unforeseen circumstances. That is so in part because the Principle of Independence says that "Final decisions must be based on objective, unbiased assessments of all information, and must be documented with reasons explicitly stated."

3. Please provide the following information regarding ongoing proceedings involving new plant applications:

a. The number of contentions admitted in each proceeding:

For ongoing proceedings, as of July 9, 2010:

1. *Bell Bend* (COL): 0 admitted
2. *Bellefonte* (COL): 4 admitted – 2 dismissed by the Commission as inadmissible (2 remaining)
3. *Bellefonte* (CP): 0 admitted
4. *Calvert Cliffs* (COL): 3 admitted – 2 dismissed by the Board on motions for summary disposition (1 remaining)
5. *Comanche Peak* (COL): 5 admitted – 1 dismissed by the Board as moot, 1 dismissed in part by the Board as moot, remaining issues consolidated by the Board into 1 contention (1 remaining)
6. *Fermi* (COL): 5 admitted —1 dismissed by the Board on motion for summary disposition (4 remaining)
7. *Levy County* (COL): 3 admitted – 1 dismissed by the Board on approval of the parties' settlement agreement (2 remaining)
8. *North Anna* (COL): 2 admitted – 1 dismissed as moot (1 remaining)
9. *Shearon Harris* (COL): 1 admitted – 1 dismissed by the Board as inadmissible upon remand from the Commission (0 remaining)
10. *South Texas* (COL): 8 admitted —5 dismissed by the Board as moot, remaining issues consolidated by the Board into 1 contention (1 remaining)
11. *Virgil C. Summer* (COL): 0 admitted (on remand from the Commission, the Board again found the remanded portions of one of the contentions to be inadmissible)
12. *Vogtle* (COL): 1 admitted – 1 dismissed by the Board on motion for summary disposition (0 remaining)
13. *Watts Bar* (OL): 2 admitted – 1 dismissed by the Board as moot (1 remaining)
14. *William States Lee* (COL): 0 admitted

b. The number of decisions appealed to the Commission and the amount of time required for the Commission to reach a decision:

There have been 17 appeals of licensing board rulings in ongoing new reactor licensing proceedings since 2008. The following chart provides the amount of time elapsed between the appeal and the Commission's decision.

Name of Proceeding	Appeal	Description of Commission Decision	Time Elapsed Between Appeal and Commission Decision (days)
<i>Bell Bend</i> (COL)	Eric Joseph Epstein's Appeal of the Memorandum and Order issued by the Atomic Safety and Licensing Board on August 10, 2009 (August 20, 2009);	CLI-10-7, 71 NRC ____ (January 7, 2010); (addressing petitioner's appeal of Board decision denying request for hearing)	140
<i>Bellefonte</i> (OP)	Brief on Appeal of LBP-10-7 by Blue Ridge Environmental Defense League, Bellefonte Efficiency and Sustainability Team and the Southern Alliance for Clean Energy (April 20, 2010);	Decision pending on petitioners' appeal of Board's denial of petition to intervene	Pending
<i>Calvert Cliffs</i> (COL)	Applicant's Notice of Appeal, Brief on Appeal of LBP-09-4 (April 3, 2009);	CLI-09-20, 70 NRC ____ (October 13, 2009); (addressing applicants' appeal of Board decision granting request for hearing)	193
<i>Comanche Peak</i> (COL)	NRC Staff Notice of Appeal, Brief on Appeal, and Request for Stay of Sections IV and V.B of LBP-10-5, Order (Ruling on Intervenor's Access to ISG-016) (March 22, 2010);	Decision pending on NRC Staff's appeal of Board ruling on request by a party for sensitive unclassified non-safeguards information	Pending
<i>Fermi</i> (COL)	Applicant's Notice of Appeal, Brief on Appeal of LBP-09-16 (August 10, 2009);	CLI-09-22, 70 NRC ____ (November 17, 2009); (addressing applicant's appeal of Board decision granting request for hearing)	99
<i>Levy County</i> (COL)	Applicant's Notice of Appeal, Brief on Appeal of LBP-09-10 (July 20, 2009)	CLI-10-2, 71 NRC ____ (January 7, 2010); (addressing applicant's appeal of Board decision granting request for hearing)	171

Name of Proceeding	Appeal	Description of Commission Decision	Time Elapsed Between Appeal and Commission Decision (days)
<i>Shearon Harris</i> (COL)	Progress Energy's Appeal of the Atomic Safety and Licensing Board's Decision Admitting the North Carolina Waste Awareness and Reduction Network (November 10, 2008) NRC Staff Notice of Appeal of LBP-08-21, Memorandum and Order (Ruling on Standing and Contention Admissibility), and Accompanying Brief (November 10, 2008)	CLI-09-8, 69 NRC 317 (May 18, 2009); (addressing applicant and NRC Staff's appeals of Board decision granting request for hearing)	189
<i>Shearon Harris</i> (COL)	Notice of Appeal, Request for Oral Argument, and Brief Supporting Notice of Appeal by NC WARN (July 22, 2009);	CLI-10-9, 71 NRC __ (March 11, 2010); (addressing petitioner's appeal of two Commission decisions and three Board decisions, including Board decision denying request for hearing)	232
<i>South Texas</i> (COL)	Notice of Appeal (February 9, 2010)	CLI-10-16, 71 NRC __ (June 17, 2010); (addressing intervenors' interlocutory appeal of Board ruling not to admit late-filed contentions)	128

Name of Proceeding	Appeal	Description of Commission Decision	Time Elapsed Between Appeal and Commission Decision (days)
<i>South Texas</i> (COL)	NRC Staff Notice of Appeal, Brief on Appeal, and Request for Stay of LBP-10-2, Order (Rulings on the Admissibility of New Contentions and on Intervenor's Challenge to Staff Denial of Documentary Access) (February 9, 2010)	Decision pending on NRC Staff's appeal of Board ruling on request by a party for sensitive unclassified non-safeguards information	Pending
<i>Virgil C. Summer</i> (COL)	Brief on Appeal of Sierra Club and Friends of the Earth (February 27, 2009); Notice of Appeal, Supporting Brief (February 27, 2009)	CLI-10-1, 71 NRC ____ (January 7, 2010); (addressing petitioners' appeals of Board decision denying request for hearing)	314
<i>Virgil C. Summer</i> (COL)	Notice of Appeal, Brief on Appeal of Sierra Club and Friends of the Earth (March 26, 2010)	Decision pending on petitioners' appeal of Board decision denying on remand request for hearing	Pending
<i>Vogtle</i> (COL)	Southern Nuclear Operating Company's Brief in Support of Appeal of LBP-09-3 (March 14, 2009) NRC Staff Notice of Appeal of LBP-09-3, Memorandum and Order (Ruling on Standing and Contention Admissibility), and Accompanying Brief (March 16, 2009)	CLI-09-16, 70 NRC ____ (July 31, 2009); (addressing NRC Staff and applicant's appeals of Board decision granting request for hearing)	137

Name of Proceeding	Appeal	Description of Commission Decision	Time Elapsed Between Appeal and Commission Decision (days)
Watts Bar (OL)	Notice of Appeal, Brief on Appeal of LBP-09-26 by Sierra Club, Blue Ridge Environmental Defense League, Tennessee Environmental Council, and We the People, Inc. (December 3, 2009)	CLI-10-12, 71 NRC ____ (March 26, 2010); (addressing petitioners' appeal of Board decision denying late-filed petition to intervene)	113

c. A chart comparing the conduct of each proceeding compared to the Model Milestones listed in 10 CFR Part 2 Appendix B:

The following chart provides a comparison of the conduct of new reactor licensing proceedings with the Model Milestones in 10 C.F.R. Part 2, Appendix B (II). At this time, none of these proceedings has passed the fourth milestone.

	Federal Register Notice	Ruling on Petitions	Initial Scheduling Order	Proposed Late-filed Contentions on SER and EIS / Motions for Summary Disposition	Ruling on Late-filed Contentions / Motions for Summary Disposition; schedule set for remainder of proceeding
Bell Bend (COL)	March 18, 2009 74 Fed. Reg. 11,606	August 10, 2009 (Model Milestone: August 5, 2009)	N/A (petitions to intervene denied)	N/A	N/A
Bellefonte (COL)	April 11, 2008 73 Fed. Reg. 19,904 (extending time in original notice published at 73 Fed. Reg. 7611 (Feb. 8, 2008))	September 12, 2008 (Model Milestone: August 29, 2008) 10 C.F.R. § 2.309(i) notice issued on August 22, 2008	Not yet issued (Model Milestone: November 6, 2008)		

	Federal Register Notice	Ruling on Petitions	Initial Scheduling Order	Proposed Late-filed Contentions on SER and EIS / Motions for Summary Disposition	Ruling on Late-filed Contentions / Motions for Summary Disposition; schedule set for remainder of proceeding
<i>Bellefonte</i> (CP)	March 13, 2009 74 Fed. Reg. 10,969	April 2, 2010 (Model Milestone: July 31, 2009)	N/A (petition to intervene denied)	N/A	N/A
<i>Calvert Cliffs</i> (COL)	September 26, 2008 73 Fed. Reg. 55,876	March 24, 2009 (Model Milestone: February 13, 2009) 10 C.F.R. § 2.309(i) notice issued on February 5, 2009	April 22, 2009 (Model Milestone: May 18, 2009)	<u>Draft EIS</u> ¹ DEIS issued on April 16, 2010; late-filed contention on DEIS submitted on June 25, 2010 (Model Milestone: May 17, 2010)	<u>Draft EIS</u> Ruling on June 25, 2010 DEIS contention has not been issued (Model Milestone: July 12, 2010)
<i>Comanche Peak</i> (COL)	February 5, 2009 74 Fed. Reg. 6177	August 6, 2009 (Model Milestone: June 25, 2009) 10 C.F.R. § 2.309(i) notices issued on June 18, 2009 and July 28, 2009	October 28, 2009 (Model Milestone: September 30, 2009)		
<i>Fermi</i> (COL)	January 8, 2009 74 Fed. Reg. 836	July 31, 2009 (Model Milestone: May 28, 2009)	September 11, 2009 (Model Milestone: September 24, 2009)		

¹ To the extent other motions might have been filed at various times in the proceeding, they are not included in this chart. *The model milestones include only the most significant events in the proceeding 10 C.F.R. Part 2, Appendix B (II).

	Federal Register Notice	Ruling on Petitions	Initial Scheduling Order	Proposed Late-filed Contentions on SER and EIS / Motions for Summary Disposition	Ruling on Late-filed Contentions / Motions for Summary Disposition; schedule set for remainder of proceeding
		10 C.F.R. § 2.309(i) notice issued on May 21, 2009			
Levy County (COL)	December 8, 2008 73 Fed. Reg. 74,532	July 8, 2009 (Model Milestone: April 27, 2009) 10 C.F.R. § 2.309(i) notice issued on April 24, 2009 (stating that decision would be issued by the end of June 2009)	August 27, 2009 (Model Milestone: September 1, 2009)		
North Anna (COL)	March 10, 2008 73 Fed. Reg. 12,760 (supplemental notice published at 73 Fed. Reg. 21,162 (April 18, 2008))	August 15, 2008 (Model Milestone: July 28, 2008) 10 C.F.R. § 2.309(i) notice issued on July 8, 2008	September 10, 2008 (Model Milestone: October 9, 2008)	<u>Draft SEIS</u> DSEIS issued on December 19, 2008; no late-filed contentions on DSEIS were submitted (Model Milestone: January 21, 2009) SER with open items SER with open items issued on August 7, 2009; no late-filed	

	Federal Register Notice	Ruling on Petitions	Initial Scheduling Order	Proposed Late-filed Contentions on SER and EIS / Motions for Summary Disposition	Ruling on Late-filed Contentions / Motions for Summary Disposition; schedule set for remainder of proceeding
				<p>contentions on SER with open items were submitted (Model Milestone: September 8, 2009)</p> <p><u>SER</u></p> <p>SER has not been issued</p> <p><u>Final SEIS</u></p> <p>FSEIS issued on March 19, 2010; no late-filed contentions on FSEIS were submitted (Model Milestone: April 19, 2010)</p> <p><u>Summary disposition</u></p> <p>No motions for summary disposition filed in response to SER with open items or DSEIS</p>	
Sharon Harris (COL)	June 4, 2008 73 Fed. Reg. 31,899 (supplemental notice)	October 30, 2008 (Model Milestone: October 22, 2008)	N/A (petition to intervene denied)	N/A	N/A

	Federal Register Notice	Ruling on Petitions	Initial Scheduling Order	Proposed Late-filed Contentions on SER and EIS / Motions for Summary Disposition	Ruling on Late-filed Contentions / Motions for Summary Disposition; schedule set for remainder of proceeding
	published at 73 Fed. Reg. 33,119 (June 11, 2008)	10 C.F.R. § 2.309(i) notice issued on October 20, 2008			
South Texas (COL)	February 20, 2009 74 Fed. Reg. 7934	August 27, 2009 (19 contentions) September 29, 2009 (9 contentions) (Model Milestone: July 10, 2009) 10 C.F.R. § 2.309(i) notice issued on July 1, 2009	October 20, 2009 (Model Milestone: October 23, 2009/ November 23, 2009)	Draft EIS DEIS issued on March 19, 2010; late-filed contentions on DEIS submitted on May 19, 2010 (Model Milestone: April 19, 2010) <u>SER with open items</u> SER with open items has not been issued <u>SER</u> SER has not been issued <u>Final EIS</u> FEIS has not been issued <u>Summary Disposition</u> No motions for summary disposition	Draft EIS Ruling on May 19, 2010 DEIS contentions has not been issued (Model Milestone: June 14, 2010)

	Federal Register Notice	Ruling on Petitions	Initial Scheduling Order	Proposed Late-filed Contentions on SER and EIS / Motions for Summary Disposition were filed in response to DEIS	Ruling on Late-filed Contentions / Motions for Summary Disposition; schedule set for remainder of proceeding
<i>Virgil Summer</i> (COL)	October 10, 2008 73 Fed. Reg. 60,362	February 18, 2009 (Model Milestone: February 27, 2009)	N/A (petitions to intervene denied)	N/A	N/A
<i>Vogtle</i> (COL)	September 16, 2008 73 Fed. Reg. 53,446	March 5, 2009 (Model Milestone: February 3, 2009) 10 C.F.R. § 2.309(i) notices issued on February 4, 2009 and February 18, 2009	August 17, 2009 (Discovery Schedule) (Model Milestone: April 29, 2009)	N/A (Board dismissed the 1 remaining contention on motion for summary disposition)	N/A
<i>Watts Bar</i> (OL)	May 1, 2009 74 Fed. Reg. 20,350	November 19, 2009 (Model Milestone: September 19, 2009) 10 C.F.R. § 2.309(i) notice issued on October 22, 2009	May 26, 2010 (Model Milestone: January 13, 2010)		
<i>William States Lee</i> (COL)	April 28, 2008 73 Fed. Reg. 22,978 (supplemental notice published at 73 Fed. Reg. 34,348 (June 17, 2008))	September 22, 2008 (Model Milestone: September 15, 2008)	N/A (petition to intervene denied)	N/A	N/A

4. **NRC issued SECY 09-0018, "Streamlining Design Certification Rulemakings," on January 30, 2009. This report identified numerous improvements in the Design Certification rulemaking process which resulted in a significant reduction in rulemaking schedule duration. Is a similar review being performed for the Combined License (COL) hearing process? If so, what improvements should be expected with regard to the minimum time for (COL) hearings?**

The Chairman has directed the staff to conduct a review of the new reactor licensing review process within one year after issuance of the first combined license. Consistent with the recommendation made by the Bipartisan Policy Center in its April 6, 2010 report, the agency will identify, assess, and document enhancements relevant to the new reactor licensing review process, including the hearing process. This planned review will be in addition to the Office of New Reactors' current practice of identifying and implementing, as appropriate, insights gained from the review of new reactor applications that do not require changes to Commission policy.

5. Will the Commission allow COL hearings to begin before the relevant design certification rulemaking is final?

The Commission does allow and in fact already has allowed COL contested hearings to begin before the relevant design certification rulemaking is final. The regulations provide that an applicant for a combined license may, at its own risk, reference in its application a design which has been docketed but not yet certified. In accordance with this provision and the Commission's Policy Statement on the Conduct of New Reactor Licensing Proceedings, the Commission in three adjudicatory decisions has upheld this practice. A licensing board considering a COL application referencing a design certification application might conclude the proceeding and determine that the COL application is otherwise acceptable before the design certification rule becomes final. However, if the licensing board had admitted and held in abeyance a contention related to the contents of the design certification, the licensing board decision could be delayed until the design certification rulemaking has been completed or the licensing board holds a hearing on the contention.

6. NRC staff has indicated the design-centered review process has been successful in yielding resource savings. When will these savings become evident in the review schedules for subsequent COL applications?

The NRC has received 18 combined license (COL) applications for 27 reactor units. Thirteen of these COLs are under active review; eight of these 13 are subsequent COLs (SCOLs). Of the 18 COLs received, applicants for five of these have asked that NRC reviews be put on hold. Experience with these applications has demonstrated that the design-centered review approach has been successful in achieving standardization around a selected design and has resulted in both a clear safety focus and resource savings. Further, the staff works actively with applicants to resolve open issues related to design, siting, and schedule modifications using a variety of interactions including: (1) pre-application audits, (2) site visits, (3) reviews of topical/technical reports, (4) public meetings, and (5) Design-Centered Working Group meetings. Several resource and schedule savings have been identified for subsequent COL (SCOL) applications using the design centered approach. In FY 2008 and 2009, the NRC staff identified and eliminated two of the six phases established for the review of SCOL applications, leading to resource and schedule savings without detracting from the staff's safety focus. Additionally, the NRC staff has found that approximately 60 percent of the chapters involved in a SCOL review can be completely or partially incorporated by reference from the reference COL review, resulting in a planned resource expenditure reduction of approximately 50 percent to complete the review. Finally, SCOL applications submitted in the future will benefit from additional lessons learned from current reviews as well as construction experience.

7. How does the duration between issuance of a Draft Environmental Impact Statement and issuance of the Final Environmental Impact Statement for NRC COL projects compare with major U.S. Army Corps of Engineers projects? Could programmatic improvements be made to reduce the approximate year duration at the NRC? If so, how soon could these improvements be implemented?

While the NRC and the U.S. Army Corps of Engineers (Corps) have partnered on a number of Environmental Impact Statements (EISs) for new reactor projects, the NRC is the "lead" Federal agency and the Corps is the "cooperating" Federal agency. For major Corps projects that do not involve the NRC, the Corps reported that the time between Draft and Final EISs typically has been approximately 18 months to 3 years.

The NRC expects to proceed from Draft to Final EIS in approximately one year. This timeframe may be affected by the number and nature of comments submitted in response to the draft. Additionally, because these EISs are being processed concurrently with budgeted resources, any unexpected project changes required on any EIS will likely impact others as well.

As an example, for the four ESPs we have issued to date, the times from draft to final EIS ranged from 11 months – 24 months. The 24-month duration was for North Anna. The extended timeframe was the result of a significant design change by the applicant late in the process.

Programmatic improvements have been made to reduce the application review duration, including the time between the draft and final EIS. As part of the NRC's 2008 Combined License Review Task Force to improve the effectiveness and efficiency of new reactor application reviews, the staff interacted with other Federal agencies to improve its understanding of practices and plans that those agencies followed in implementing NEPA. In addition to the methods and approaches implemented in developing the NRC's license renewal framework that were transferrable to new reactor reviews, the staff has taken steps to prepare for these more complex licensing actions. These steps include development of information management tools to administratively manage every comment received, to appropriately bin comments into like-kind groupings, and to take advantage of responses reflecting NRC established positions. For example, in the last year, the staff issued NUREG/BR-0468, "Frequently Asked Questions About License Applications for New Nuclear Power Reactors." The substance of that document has been integrated into the

staff's comment response information system. This allows the staff to focus more effort on site-specific comments that could be time consuming. As the NRC gains experience with the first of the COL EISs, other opportunities for technical review and schedule improvement may arise and the staff will determine how to enhance its technical review and project execution practices.

- 8. Why does the rulemaking schedule vary between design certifications? For example, the ABWR DC amendment to address aircraft impact is scheduled for completion of the environmental report in June of 2010 but the rulemaking is not scheduled to finish until August of 2011, 13 months later. Conversely, the final safety evaluation report for the ESBWR is expected to be issued January 18, 2011, with the rulemaking completed in September of 2011.**

In a memorandum to the Commission, the NRC staff estimated a streamlined duration of 12.5 months to complete an initial design certification rulemaking as measured from the time of completion of the NRC's safety and environmental (severe accident mitigation alternatives) reviews. The streamlined approach was based on a highly standardized process for conducting the design certification rulemaking, and a standardized rule format and content which was used for the first four design certification rules. By contrast, an amendment for a design certification rule significantly deviates from the standardized approach for an initial design certification and may require a shorter or longer duration, depending on the nature and scope of the amendment. The ABWR DC amendment poses unique challenges. It is the first design certification rulemaking to address an amendment by an alternate supplier (i. e. the entity applying for the amendment – who intends to supply the ABWR certified design to third party users – is not the original applicant for the ABWR design certification). In addition, the applicant for the ABWR amendment requested that the NRC use a different approach from that which the NRC had originally intended to use for design certifications with alternate suppliers. A certified design with multiple suppliers is both a de novo issue, and an issue that is inapplicable at the initial design certification stage. The NRC has spent considerable time and resources developing the agency's overall regulatory approach and justification for alternate vendors, as well as the regulatory approach and justification to address the unique circumstances of the ABWR amendment. Therefore, the ABWR amendment rulemaking will require more time to process than an initial design certification rulemaking such as the ESBWR. The staff strives to further improve on these rulemaking schedules wherever possible.

- 9. Review and writing of Safety Evaluation Report (SER) chapters by the NRC Staff, which are then reviewed with ACRS, appears to be a lengthy process. What improvements could be made to expedite this process?**

The NRC staff believes it has developed an efficient approach to reviewing and writing Safety Evaluation Report (SER) chapters by holding review meetings that include all reviewers to expedite the concurrence process; expanding the audience for the project performance meetings to facilitate discussion of issues; developing SER chapter templates and template guidance to streamline the writing process, and creating a shared intranet site for staff to exchange ideas and easily obtain references when developing their SER input. Staff continually looks for ways to improve its approach to reviewing and writing SER chapters.

10. Does the NRC have adequate resources to conduct design certification and COL reviews without any undue delays? Has the NRC experienced any competition for resources among the various design centers? If so, how does NRC manage internal resources to minimize such delays?

Yes, sufficient resources to continue the licensing review and construction inspection activities, for the proposed new nuclear power reactor projects that are currently planned, have been allocated in FY 2010 and are requested for FY 2011, including a request for approval to reprogram funds.

The NRC developed an implementation strategy for managing new reactor internal resources when resource conflicts occur. The NRC focuses on COL applications for projects with strong near-term construction intentions and the necessary supporting activities, including design certifications, early site permits, limited work authorizations, construction inspection program development, necessary internal infrastructure, vendor inspection programs, and closely related international cooperation. The NRC continues to emphasize those projects that are expected to complete licensing and - if found to meet NRC safety regulations - construction and begin operation in the near term (potentially resulting in commercial operation in the 2016–2017 timeframe).

11. When does the Commission anticipate finalizing the oversight process that will be used during construction of new reactors?

At this time, the agency has in place the structure and procedures required to conduct the new reactor construction oversight process for ongoing and near-term construction activities. The process for oversight of new reactor construction has been documented in Inspection Manual Chapters and inspection procedures. All inspection procedures that are required to implement inspections of licensee activities related to inspections, tests, analysis and acceptance criteria (ITAAC) have been approved and issued for use. The NRC continues to make significant progress in the development and improvement of programs and procedures to support the inspection of activities that would occur later in construction. These include procedures such as those required for inspection of licensee operational readiness. These remaining procedures are in development and expected to be completed in fiscal years 2010 and 2011, which would be in time to fully support the inspection requirements for those applicants with the earliest potential construction schedules.

A construction assessment process has been established and is in place as described in an inspection manual chapter that was issued in December 2009. This process is expected to be fully implemented in July 2010 to assess licensee performance related to construction activities at the proposed Vogtle site. As directed by the Commission, the NRC staff is currently reviewing the construction assessment process for possible improvements. One of the goals is to address the possible inclusion of objective elements such as construction programs performance indicators and a significance determination process analogous to those used in the reactor oversight process for the operating fleet. The NRC staff plans to present options to the Commission in the near future.

12. When will agency staff finalize guidance for ITAAC closure and maintenance?

The NRC staff issued guidance on ITAAC closure in October 2009. This regulatory guide adopts the industry guidance for ITAAC closure as documented by NEI in a January 2009 publication. The NRC staff continues to hold regular public workshops to solicit input and exchange views on issues related to ITAAC completion, closure documentation, and ITAAC maintenance. A number of external stakeholders, including industry representatives, participate in these public workshops. Through these workshops, the NRC staff has developed an enhanced approach to address ITAAC maintenance. The NRC staff is currently developing a proposed rulemaking to codify ITAAC maintenance-related requirements, tentatively scheduled to be published for public comment in the fall of 2010. Upon completion of this rulemaking in 2011, staff plans to provide final guidance on ITAAC maintenance.

13. Please provide a list of all rules issued since September 2007 that impact DC or COL applicants. Please include all proposed rules anticipated to be issued prior to issuance of the first COL.

Rules issued since September 2007 that affect Design Certification (DC) applications or Combined License (COL) applicants are as follows (Note: dates reflect publication of a final rule in the Federal Register):

- Limited Work Authorizations for Nuclear Power Plants (10 CFR Parts 2, 50, 51, 52, and 100) – October 2007
- Clarification of NRC Civil Penalty Authority Over Contractors and Subcontractors Who Discriminate Against Employees for Engaging in Protected Activities –(10 CFR Parts 30, 40, 50, 52, 60, 61, 63, 70, 71, 72, and 76) – November 2007
- Fitness for Duty Programs (10 CFR Part 26) – March 2008
- Industry Codes and Standards; Amended Requirements (10 CFR Part 50) – September 2008
- Protection of Safeguards Information (10 CFR Parts 2, 30, 40, 50, 52, 60, 63, 70, 71, 72, 73) – October 2008
- Power Reactor Security Requirements (10 CFR Parts 50, 52, 72, and 73) – March 2009
- Consideration of Aircraft Impacts for New Nuclear Power Reactors (10 CFR Parts 50 and 52) – June 2009

Rules anticipated to be issued prior to issuance of the first COL (through FY2012):

- Emergency Preparedness
- Economic Simplified Boiling Water Reactor (ESBWR) DC
- AP1000 Design Certification Amendment
- Access Authorization and Physical Protection Requirements during Nuclear Power Plant Construction
- ITAAC Maintenance
- ABWR - Aircraft Impact Design Certification Amendment

- EPR Design Certification
- US-APWR Design Certification

The following are rules that may affect DC or COL applicants, as well as the operating fleet, anticipated to be issued prior to potential issuance of the first COL (through FY2012) :

- Risk-Informed Emergency Core Cooling system (ECCS) Requirements
- Performance-Based Fuel Cladding Acceptance Criteria
- ASME Code Addenda
- ASME Code Case Incorporation of Regulatory Guides
- Firearms Guidelines Implementation of Atomic Energy Act Sec. 161A
- IEEE-603-1998 Incorporation by Reference

14. Does the NRC have a process in place to ensure that Requests for Additional Information (RAI's) are catalogued for various design centers so that staff can compare potential new RAI's with previous questions to avoid duplication?

Yes, the NRC staff developed a specific procedure that provides guidance on the RAI process in the Office of New Reactors (NRO). The staff uses an electronic RAI (eRAI) repository when developing RAIs. There are several sorting features and filters that can be used to assist staff, supervisors, and managers to focus on their area of interest. Furthermore, RAI processing is an open process among NRC staff. Although specific individuals are assigned responsibilities during the processing, an RAI and its associated questions may be viewed by other staff members, thus increasing communications and information sharing for multiple reviews. For each COL, the staff looks at the previously asked questions to assure no duplication of RAIs on that application.

- 15. I understand that the use of audit teams have yielded significant efficiencies in the review process for license extension applications, particularly improving the clarity of the RAI's issued and the quality of the responses. Has the NRC maximized the use of this approach in new plant license reviews to resolve issues and improve communication between NRC staff and applicants?**

The NRC staff has incorporated the use of audit teams and onsite reviews to effectively identify technical information that needs to be submitted to support reviews and improve the quality of the RAIs for specific technical issues. In most circumstances, a regulatory audit is part of a larger regulatory action. Performing a regulatory audit allows the staff to conduct its review more efficiently and gain insights on the applicants' processes and procedures. The NRC's Office of New Reactors (NRO) has issued guidance to staff to define how to conduct regulatory audits in support of new reactor licensing activities. This guidance includes the requirement for staff to document audit findings for future use.

- 16. Although the 15 year design certification period encourages stability and promotes standardization, technological improvements are more dynamic and constant. Significant safety, security, and productivity improvements should be encouraged during the life of a certification without undue process delay. Does the NRC's current processes balance innovation and standardization and provide for timely decisions on improvements within the bounds of the design certification term?**

Yes. Design certification finality and modification provisions are contained in 10 CFR Part 52. These provisions apply to those utilities that reference design certification rules in their applications, including construction permits, and operating licenses under 10 CFR Part 50. As described in Part 52, the Commission may modify requirements on the certification information when it determines in a rulemaking that the change meets at least one of the seven criteria identified in the regulation. These criteria include allowing for changes that substantially increase overall safety, reliability, or security of facility design, construction, or operation, and the direct and indirect costs of implementation of the rule change are justified in view of this increased safety, reliability, or security. This provision allows for a reasonable balance between innovation and standardization.

In addition, Part 52 also provides for several processes that would permit an applicant or licensee to propose changes and departures from the standard design. Depending on the nature of the proposed changes and or departures from the standard design, an amendment to the design certification may be required through the rulemaking process a combined license applicant may be able to propose a departure or exemption from the standard design for a specific COL. All current design certification rules contain these Part 52 provisions, and the NRC intends to maintain these provisions when it certifies future designs.

- 17. Significant time has passed since the NRC was last engaged in licensing new plants and overseeing their construction and there have likely been several revisions to issue resolution processes since then, e.g. the process for resolving differing professional views. Are these processes adequate to address the challenges ahead in the new plant licensing process?**

The NRC values the views and opinions of its employees and strives to maintain an open, collaborative work environment where all employees engaging in all activities in all offices are comfortable raising concerns without fear of retaliation. The NRC has several processes available for employees to raise and pursue differing views, including the Open Door Policy, the Non-Concurrence Process, and the Differing Professional Opinions Program. Although the NRC believes that these processes are working well, these processes are routinely evaluated to ensure that they remain adequate to address the resolution of differing professional views throughout the agency. The NRC considers these processes to be a fundamental part of fostering a strong safety culture at the agency.

- 18. The NRC has a "Safety Goal" that the risk from each of the 104 nuclear power plants will be less than IE-6/yr although the actual values vary among the existing 104 plants. New, more advanced reactors are expected to exhibit values among the lowest. Given that new plants are inherently safer, there may be a temptation within the agency to set new, more restrictive limits on new reactors. Is the agency considering such a change? If so, please describe why a change is being considered if IE-6/yr is sufficient and any cost-benefit analysis done in support of such a change.**

The Commission's policy statement on safety goals for nuclear power plants established qualitative goals, as well as quantitative objectives that would gauge achievement of the safety goals. The quantitative objectives are expressed as fractions of the risk of accidental and cancer fatalities in the area near a nuclear power plant. In addition, through a series of Commission policy papers and staff requirements memoranda, the Commission established expectations, including risk metrics, for an enhanced level of safety performance for new reactors. As a result of these policies, applicants for new reactor design certification have proposed various related safety enhancements, and the Commission would codify these safety features through design certification rulemaking. The Commission is not considering a change to these safety goals or policies.

19. What are the NRC's objectives in conducting a study of cancer in populations living around nuclear facilities? Given the inherent limitations associated with the type of study being considered, are NRC's objectives achievable?

This study will provide the NRC with the most current scientific information related to cancer mortality and incidence rates for populations that live near past, present, and proposed nuclear power facilities. The NRC staff has used a 1990 study conducted by the National Cancer Institute (NCI), "Cancer in Populations Living Near Nuclear Facilities," as a risk communication tool for addressing stakeholder concerns about cancer mortality attributable to the operation of nuclear power facilities. However, the NCI report is almost 20 years old. A new study would provide an up-to-date review of cancer incidence and mortality risk for populations living near past, present, and proposed NRC-licensed nuclear facilities, benefitting from improved data sets now available. Our objective is to determine whether the cancer risk to populations living near or adjacent to nuclear facilities is different from the risks to the average population. The proposed study would be performed in two phases by the National Academy of Sciences (NAS): 1) a scoping study to determine the feasibility, technical merits, and approach to performing the cancer incidence and mortality epidemiology study and, depending on the results of the scoping study, and 2) the actual study.

20. The report of the NAS Committee VII on Biological Effects of Ionizing Radiation (BEIR. VII) stated "In general, additional ecological studies of persons exposed to low levels of radiation from environmental sources are not recommended." What is NRC's rationale for going forward with such a study in light of the BEIR VII Committee's recommendation?

The NRC's request to NAS defers to the Academy's expertise in determining the best available study design and does not include a specific approach (e.g., ecological study). The NAS is aware of the BEIR VII statement and will consider it during the first phase in recommending an approach to meet the study objectives.

- 21. Given the NRC's responsibility to ensure adequate protection of public health and safety, why did the NRC decide to have an outside organization take the responsibility for designing and conducting a study of cancer in populations living around nuclear facilities?**

The NRC routinely uses outside expertise to perform research to support the agency's mission. The NAS was established, in part, to provide scientific information to federal agencies. The NAS study process is independent, transparent, objective, and technically rigorous, ensuring that the new study will be comprehensive and accurate.

22. How does the NRC plan on exercising review and oversight of a study conducted by another organization?

The NRC will provide information to the NAS, but the Academy's Congressional mandate gives it full autonomy in deciding how best to meet the NRC's request. The NAS will hold several public meetings in the project's first phase, allowing stakeholders to provide input and information on conducting the study. NRC will review the results of the scoping study to determine whether the study objectives can be met before proceeding with the actual study.

23. What level of expertise and resources does the NRC have within the agency for conducting, managing, or interpreting the results of such a study?

The NRC has sufficient expertise and staff resources for conducting, managing, and interpreting the results of the study. A number of the NRC staff hold PhDs with specialization in public health, health physics, and radiobiology.

- 24. Has the NRC assessed the potential statistical power needed for such a study, given the high incidence of cancer in the U.S., the very low levels of radiation emitted from nuclear power plants, and the relatively small number of people that live in close proximity to the facilities? If so, is it possible to conduct a study that could yield statistically meaningful results? Over what time frame would such a study need to be conducted in order to yield statistically meaningful results? Please describe any other results from the NRC's assessment.**

The NRC has not performed any statistical calculations or assessments related to this study. The NAS will examine these questions, among others, during the first phase of its work as it formulates its recommendations for the best study design to meet the NRC's objectives.

25. The National Cancer Institute (NCI) would seem to be the most appropriate organization to conduct such a study. Did the NRC contact NCI and request that the Institute conduct the study? If so, what was NCI's response? Please provide all relevant correspondence including letters, email and meeting transcripts.

The NRC did approach NCI management about performing a new study under contract to the NRC. Due to staffing limitations, NCI was unable to commit resources for this activity for the foreseeable future. The NAS will draw its project team from a wide range of technical experts, which could include NCI members. The relevant correspondence is included in this submittal to the Committee.

26. Is it correct that the NRC had initiated work on the study through the Oak Ridge Associated Universities (ORAU)? If so, why did the NRC decide to not proceed with tasking the ORAU to conduct the study? Please provide all relevant correspondence including letters, email and meeting transcripts.

Yes, the NRC originally planned to have ORAU conduct the study. However, it was important to cast a broader net in considering all expertise available and capable of conducting this important work. This broader consideration of potential investigators was not an indication of any deficiency in the technical quality of ORAU's work; the aim was to ensure that the selected investigator brings a broad social and national policy perspective to the study. With these considerations in mind, the NRC staff initiated a more comprehensive selection process and ultimately chose the NAS to perform the study. The relevant correspondence is included in this submittal to the Committee.

27. Chairman Jaczko, in response to my question regarding target schedules for Commission action on COL application, you indicated that the license approval process is a staff action and that in a contested proceeding, the issuance of the Atomic Safety and Licensing Board's final decision is the final action for licensing. You also stated that if there is no contested proceeding, the Commission will conduct a mandatory hearing for which there is currently no target schedule.

- a. Is it correct that a mandatory hearing will be conducted by the Commission regardless of whether a COL application is contested or uncontested? If not, why not?**

Yes, it is correct that the Commission will conduct a mandatory hearing for a COL application regardless of whether the COL application is contested or uncontested.

- b. Can a COL be issued before the Commission has issued a favorable decision on the mandatory hearing?**

The Commission is currently reviewing what actions the Commission will take in a mandatory hearing and how that action will relate to the COL decisions.

- c. If the Commission must make a decision on the mandatory hearing before a COL can be issued, do you agree that the Commission has a role in the issuance of a COL?**

The Commission is currently reviewing what actions the Commission will take in a mandatory hearing and how that action will relate to the COL decisions.

- d. Is the Commission considering adopting a target schedule for the completion of the mandatory hearing and issuance of a Commission decision?**

The Commission is currently reviewing what actions the Commission will take in a mandatory hearing and how that action will relate to the COL decisions.

28. Commissioner Ostendorff, what is the maximum annual dose to the public that the NRC has calculated for the various nuclear facilities that have experienced tritium leaks? How does this exposure compare to dose limits set by the agency to protect nuclear facility workers and the public? Please describe any associated health risks including a comparison to naturally occurring radiation and other sources of radiation commonly experienced by members of the public. Please include any additional information you believe would be useful in helping Committee members gain a more thorough understanding of the safety significance of this issue.

There have been only a few recent cases in which tritium has been detected offsite from a leak or a spill from a commercial nuclear power plant. The NRC's dose calculations indicate that, for the few cases where tritium has been detected offsite, the maximum potential annual exposure due to these leaks and spills is less than about 0.07 millirem (mrem). This dose is 0.07%, or a very small fraction of the 100 mrem maximum annual dose that is permitted by NRC regulation for members of the public. This dose is also an extremely small fraction (0.00014%) of the NRC's 5,000 mrem limit for occupationally exposed workers.

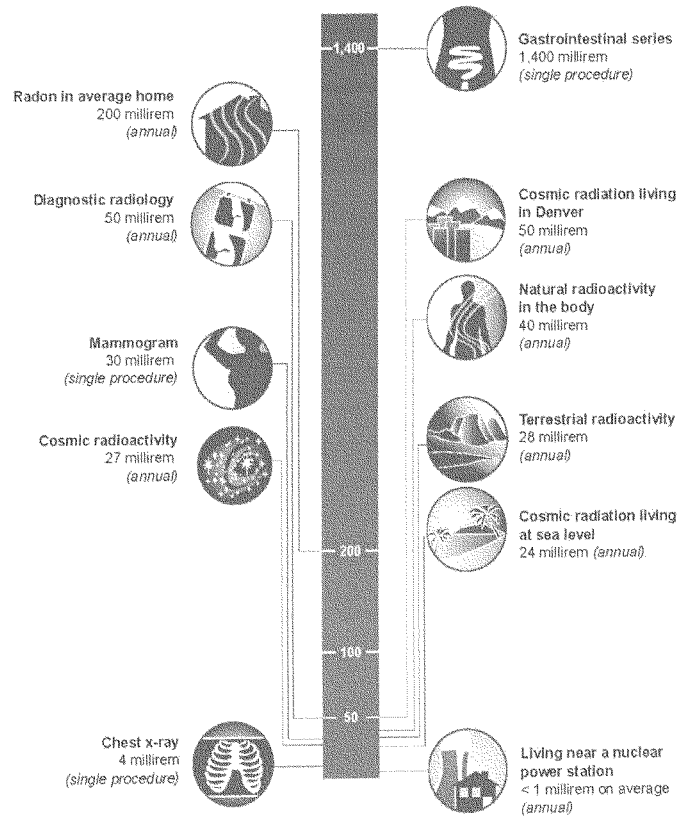
Regarding health risks, the NRC uses a linear no-threshold (LNT) dose-response relationship to describe the relationship between radiation dose and the occurrence of cancer. This dose-response model suggests that any increase in dose, no matter how small, results in an incremental increase in risk. Similarly, the smaller the dose, the smaller the risk. The U.S. Nuclear Regulatory Commission (NRC) accepts the LNT hypothesis as a conservative model for estimating radiation risk. With respect to tritium releases from nuclear power plants, the estimated offsite doses to date have been a tiny fraction of allowable NRC radiation dose limits. Therefore, an annual exposure of 0.07 mrem is not expected to result in any public health and safety consequences.

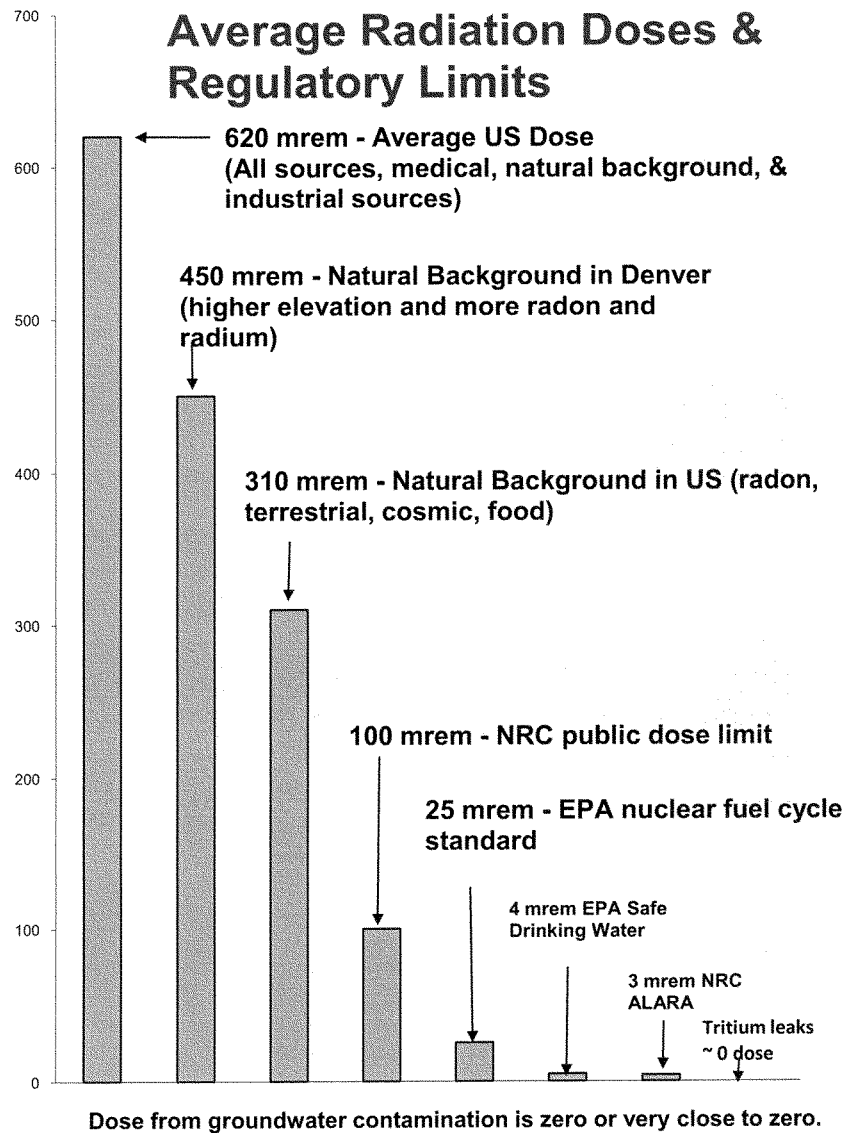
Relative doses from radiation sources are provided in the attached figure courtesy of a US EPA public communiqué entitled *Radiation: Risks and Realities*. Also, a comparison of the maximum public doses from tritium releases, to annual average US population doses due to natural background sources and radiation protection limits and standards is shown in the attached bar chart developed by the NRC staff. The average person in the United States receives about 300 mrem per year from natural background radiation, and receives another 320 mrem per year from exposures related to medical diagnostic procedures. For comparison, 0.07 mrem is less than the 0.2 mrem that a person receives in one hour of flight time on a commercial airline.

Stated another way, a dose of 0.07 mrem is equivalent to about 15 or 20 minutes of travel in a commercial airliner.

RELATIVE DOSES FROM RADIATION SOURCES

Millirem Doses





Senator George V. Voinovich

1. Preparations for Small Modular Reactors (SMRs) - The Secretary of the Department of Energy, Dr. Steven Chu, authored a recent Wall Street Journal op-ed piece entitled "America's New Nuclear Option," Secretary Chu offers a vision -the vision of recapturing American leadership in commercial nuclear technology through developing and manufacturing small modular reactors with American workers here in the U.S. He says that small modular reactors would significantly expand the options for nuclear power and its applications.

I believe that NRC is probably ready for reviews of the SMRs of light water technology, which are basically smaller scale versions of today's current reactors. For example, the B&W mPower reactor, the NuScale reactor, and other designs use the light water technology, and I believe that these applications are expected to be submitted for NRC review starting in 2013.

I believe that the Commission's real challenge is to get the NRC staff prepared for reviews of gas-cooled reactors, and to put in place the regulatory framework and licensing review basis (i.e., standards, rulemaking, etc) within the next 1-2 years so that designers know how to prepare design and licensing information to that the SMR designs need to meet since NRC has not reviewed these types of reactors in many years, this seems to be a significant challenge. In your testimony you mention some preparations for these SMRs, such as establishing an "Advanced Reactor Program" in the Office of New Reactors. Can you please describe where NRC is in establishing this program, how many people you envision working on SMRs, and when you think NRC will be ready for these reviews?

The Advanced Reactor Program (ARP) was established in 2008 to provide an organizational and managerial focus on preparing to undertake regulatory reviews of SMRs. Consistent with the Energy Policy Act of 2005, the initial emphasis of this program is on preparation activities for high temperature gas-cooled reactors (HTGRs, basis of the Next Generation Nuclear Plant). As other designs have emerged, integral pressurized water reactors (iPWRs), and liquid metal reactors (LMRs) for example, we have expanded the scope of the program to include these designs as well. Our efforts are emphasizing those designs we believe most likely to be submitted first, e.g., HTGR designs and iPWR designs.

To ensure that the NRC is ready to review licensing applications for advanced reactor designs expected to be submitted in FY 2012, the staff is pursuing a four-pronged approach that involves: (1) acquiring and training the resources needed to support the reviews, (2) identifying and resolving key technical and policy issues associated with advanced reactor designs, (3) engaging DOE, designers, and potential licensees in meaningful pre-application interactions, and coordination activities with internal and external stakeholders, and (4) developing the needed infrastructure, such as necessary regulations and guidance documents, information systems, planning and scheduling tools, and tracking systems.

Resources have been allocated to support implementation of this program in FY 2010. The President's FY 2011 budget request allows continued efforts in preparing for future licensing reviews (i.e., pre-application activities, development of the regulatory framework, and supporting technical bases for licensing). Specifically, the FY 2010 budget includes 39 FTE and \$9.5 million; the FY 2011 request includes 50 FTE and \$11.4 million. Future budget requests would reflect resources needed to implement the program based on informed projections of actual workloads.

2. Streamlining Reviews of Small Modular Reactors (SMRs) of light-water reactor technology - I would very much like to see the U.S. industry regain its global leadership role in nuclear power, and I believe that SMRs of the light water reactor technology, based upon the U.S. Navy experience, represent a very unique and important opportunity for us.

What is NRC doing to leverage the experience of Navy reactors ahead of the submission of applications for design certifications for these near-term SMRs, and leverage the experience with NRC's new licensing process, so that we can accelerate the reviews?

In the past year, the NRC met with Navy nuclear program staff and exchanged information on digital instrumentation and control (DI&C) systems. There is also a senior DI&C expert with Navy nuclear program experience on the NRC staff. In addition, the NRC is engaging in pre-application activities with plant designers, DOE, and other stakeholders well in advance of receipt of a licensing application to help support timely reviews of these new designs.

3. Improvements to the New Reactor Licensing Process – The Bipartisan Policy Center (BPC) was very complementary of both NRC and industry for the initial try of the new reactor licensing process, and I would like to congratulate the Commissioners, NRC staff, and industry who contributed to the success of the initial reviews.

In general, I share the view that we should try the new licensing process before we revise it. However, I am also a believer in continuous improvements. In Chairman Jaczko's letter forwarding the BPC report, he stated that the NRC staff will assess the improvements in the BPC report after the first combined license is issued, but this license may not be issued until sometime in 2011 or 2012.

Has NRC looked at the recommendations in the BPC report to see if there are some improvements that can be acted on today? For example, the report identifies that timing of environmental impact statements may become the pacing item in future reviews, so it may be that NRC and industry need to take a look at the timing of submitting and reviewing these now.

The NRC is carefully weighing the recommendations of the BPC. The Chairman's letter to the BPC indicated that NRC staff would continue its current practice to identify and implement, as appropriate, insights gained from the review of new reactor applications. The staff is implementing this guidance on a case-by-case basis. Additionally, the Chairman committed that the NRC will implement the BPC's recommendation to conduct a lessons-learned review after the first COL review has been completed, which may include recommended policy proposals for Commission consideration to further enhance the licensing process for future applications.

4. **Backlog of Commission work** - I'm very pleased to see a full complement of 5 very capable NRC Commissioners. Although 3 of them were only sworn into office earlier this month, I am now interested in getting on with the work at NRC. I understand that there is a backlog of several issues that are awaiting Commission decisions. Can you please discuss the most significant issues in that backlog and what the plan is for working off the backlog of work issues now that the Commission is at full strength?

There are always many issues pending before the Commission given the scope of the agency's mission and work. Therefore, many matters awaited the three new Commissioners when they arrived in April. Since then, the Commission has already completed a significant number of items, which include acting on a proposed rule for the physical protection of byproduct material, a draft Policy Statement on the protection of Cesium Chloride sources, proposed rule changes pertaining to licensee fitness for duty programs, a proposed rule to revise the definition of construction for materials applicants such as uranium in situ recovery, a final rule amending the export and import licensing regulations, as well as issuance of several adjudicatory orders. The Chairman has been working with his colleagues to discuss Commission workload during monthly agenda planning meetings in an effort to efficiently prioritize the Commission's work.

5. **NRC Review Schedules** -The NRC's web site shows the schedule for completion of the safety reviews for combined licenses, design certifications, and early site permits. However, the timelines do not include the time required for hearings. While recognizing that the timeline for hearings may be difficult to predict, I've heard from industry that this can contribute to investor concerns on schedules and regulatory process. Is there some way to provide additional information? Ideas could include a nominal timeline and/or a link to additional information on hearing process and expected timelines?

The design certification process generally is conducted via the notice and comment rulemaking process set forth in 10 C.F.R. Part 52, Subpart B and, therefore, does not include an adjudicatory hearing.

As to combined license applications, the Commission has issued internal procedures for the conduct of these hearings. In the coming months, the Commission will finalize the details of the process that we will use to effectively and efficiently conduct these hearings in a timely manner. As part of this effort, the Commission will consider establishing milestones for completing mandatory hearings.

As to early site permit (ESP) applications, to date both contested and uncontested hearings have been conducted by the Atomic Safety and Licensing Boards. The Commission has stated its expectation that the boards, in uncontested cases, will issue their final initial decisions generally within four, and at the most six, months of the Staff's issuance of its Safety Evaluation Report and Final Environmental Impact Statement. In many cases, that timeline could be significantly shorter. Additionally, the model milestones codified in 10 C.F.R. Part 2, Appendix B also provide guidelines for the conduct of contested hearings by the Boards.

Senator David Vitter

1. Last September, the Commission voted on a draft Waste Confidence rule. Two of the three sitting commissioners recommended a "limited re-noticing" to solicit public comment on the draft rule considering the Administration's indication of a pending policy change on nuclear waste disposal. Since then, the Administration has begun the termination of the repository program and filed a motion to withdraw the license application. So far, the NRC has not solicited further public comment. Given Chairman Jaczko's focus on public involvement and transparency, why has a "limited re-noticing" not been conducted? Does the agency have any plans to seek comments on the impact of this significant and controversial policy change? If so, when?

Although the three sitting Commissioners at the time had registered their individual views on the rulemaking, the Commission did not reach a decision on the final rule that would have given direction to the staff on how to proceed prior to Commissioner Klein's resignation from the Commission. Upon his departure, Commissioner Klein's vote dissolved. Since that time, the composition of the Commission has changed. The Commission is now, as a whole, determining how to proceed with this rulemaking and to give appropriate direction to the NRC staff. All of the Commissioners recognize the importance of this issue, and the Commission anticipates issuing a decision within the next several months.

2. Please provide the following information regarding ongoing proceedings involving license extensions for existing nuclear plants and the proceedings for the ten most recently completed license extensions:

- **The number of contentions admitted in each proceeding:**

For ongoing proceedings, as of July 9, 2010:

1. *Diablo Canyon*: licensing board has not issued ruling on petition at this time (petitioners have submitted 5 contentions)
2. *Indian Point*: 18 admitted – 3 contentions consolidated by the Board (15 remain pending)
3. *Pilgrim*: 2 admitted – 1 contention dismissed by the Board on motion for summary disposition, 1 contention resolved by the Board in favor of applicant after hearing (limited issue in 1 contention remains pending before the Board on Commission remand)
4. *Prairie Island*: 8 admitted – 4 dismissed by the Board on approval of the parties' settlement agreement, 3 contentions dismissed by the Board as moot (1 remains pending)
5. *Vermont Yankee*: 6 admitted – 1 dismissed by the Board on approval of the parties' settlement agreement, 1 dismissed by the Commission as inadmissible, 2 resolved by the Board in favor of the applicant after hearing, 1 resolved in favor of the petitioners after hearing, 1 held in abeyance pending applicant's compliance with Board's partial initial decision but was later dismissed because petitioner failed to show that applicant had not complied (petitions for review of the Board's partial initial decision and full initial decisions remain pending)

For the ten most recently completed license renewals:

1. *Susquehanna* (November 24, 2009): 0 admitted
2. *Beaver Valley* (November 5, 2009): petition requesting supplementation of SER filed, no contentions were submitted (the Secretary of the Commission referred the petition to the Staff for response)
3. *Vogtle* (June 3, 2009): no requests for hearing were filed
4. *Oyster Creek* (April 8, 2009): 1 admitted, 1 resolved by the Board in favor of the applicant after hearing
5. *Shearon Harris* (December 17, 2008): 0 admitted
6. *Wolf Creek* (November 20, 2008): no requests for hearing were filed
7. *James A. Fitzpatrick* (September 8, 2008): no requests for hearing were filed
8. *Palisades* (January 17, 2007): 0 admitted

9. *Monticello* (November 8, 2006): 0 admitted

10. *Nine Mile Point* (October 31, 2006): no requests for hearing were filed

- **The number of decisions appealed to the Commission and the amount of time required for the Commission to reach a decision:**

There have been 25 appeals of licensing board decisions in ongoing license renewal proceedings and the ten most recently completed license renewals. The following chart provides the amount of time elapsed between the appeal and the Commission's decision. The time elapsed between the appeal and the Commission's decision does not account for, in some cases, intervening filings or occurrences that ultimately added time to the proceeding.

Name of Proceeding	Appeal	Description of Commission Decision	Time Elapsed Between Appeal and Commission Decision (days)
<i>Indian Point</i>	Sherwood Martinelli Appeal of Board Order to Censure (December 3, 2007)	CL-07-28, 66 NRC 275 (December 12, 2007); (addressing petitioner's appeal of Board's censure)	9
<i>Indian Point</i>	Petition for Review of Atomic Safety and Licensing Board (ASLB) Orders of March 25, 2008 and March 31, 2008 Cancelling Oral Argument on WestCAN's Contentions (April 4, 2008)	CL-08-7, 67 NRC 187 (April 30, 2008); (addressing petition for review of Board's cancellation of oral argument)	26
<i>Indian Point</i>	Notice of Appeal (August 11, 2008)	CL-08-27, 68 NRC 655 (November 6, 2008); (addressing petitioners' appeal of Board's denial of petition for waiver and petition to intervene)	87
<i>Indian Point</i>	WestCAN Appeal (August 8, 2008)	CL-08-29, 68 NRC 899 (December 9, 2008); (addressing petitioners' appeal of Board's denial of petition to intervene)	123
<i>Indian Point</i>	Entergy's Petition for Interlocutory Review of Atomic Safety and Licensing Board Decision Admitting Consolidated Riverkeeper EC-3/Cleanwater EC-1 (January 7, 2009)	CL-09-6, 69 NRC 128 (March 5, 2009); (addressing applicant's petition for interlocutory review of Board's decision to admit a contention)	57

Name of Proceeding	Appeal	Description of Commission Decision	Time Elapsed Between Appeal and Commission Decision (days)
Oyster Creek	NRC Staff Notice of Appeal of LBP-06-7 and Supporting Brief (March 14, 2006) AmerGen Notice of Appeal, Brief in Support of Appeal from LBP-06-7 (March 14, 2006); Brief on Behalf of Petitioner New Jersey Department of Environmental Protection on Appeal from Order LBP-06-07 of the Atomic Safety and Licensing Board Denying Request for Hearing and Petition to Intervene (March 28, 2006) Citizens' Notice of Appeal of LBP-06-11 (April 6, 2006)	CLI-06-24, 64 NRC 111 (September 6, 2006); (addressing appeals of Board's rulings on intervention petitions) CLI-07-8, 65 NRC 124 (February 26, 2007); (addressing remaining issues from CLI-06-24)	153(days between CLI-06-24 and April 6, 2006 appeal) 335(days between CLI-07-8 and March 28, 2006 appeal)
Oyster Creek	Citizens' Petition for Review of LBP-08-12 (August 1, 2008)	CLI-08-28, 68 NRC 658 (November 6, 2008)(addressing petition for review of Board's decision denying petitioners' motion to reopen)	97
Oyster Creek	Citizens' Petition for Review of LBP-07-17 and the Interlocutory Decisions in the Oyster Creek Proceeding (January 14, 2008)	CLI-09-7, 69 NRC 235 (April 1, 2009);	443
Palisades	Petitioners' Notice of Appeal from ASLB Denial of Hearing, and Supporting Brief (March 17, 2006)	CLI-06-17, 63 NRC 727 (June 23, 2006); (addressing petitioners' appeal of Board's denial of petition to intervene)	98
Pilgrim	Pilgrim Watch's Brief on Appeal of LBP-06-23 (October 31, 2006);	CLI-07-2, 65 NRC 10 (January 11, 2007); (addressing intervenor's interlocutory appeal of Board's decision finding certain contentions inadmissible)	72

Name of Proceeding	Appeal	Description of Commission Decision	Time Elapsed Between Appeal and Commission Decision (days)
<i>Pilgrim</i>	Massachusetts Attorney General's Brief on Appeal of LBP-06-23 (October 31, 2006)	CLL-07-3, 65 NRC 13 (January 22, 2007) (addressing petitioner's appeals of Boards' decisions in <i>Pilgrim</i> and <i>Vermont Yankee</i> denying petitions to intervene)	83
<i>Pilgrim</i>	Pilgrim Watch Brief on Appeal of LBP-07-13 Memorandum and Order (Ruling on Motion to Dismiss Petitioner's Contention 3 Regarding Severe Accident Mitigation Alternatives) (November 13, 2007)	CLL-08-2, 67 NRC 31 (January 15, 2008); (addressing intervenor's petition for review of Board's decision granting applicant's motion for summary disposition)	63
<i>Pilgrim</i>	Commonwealth of Massachusetts Petition for Review of LBP-08-22 (November 12, 2008)	CLL-09-10, 69 NRC 521 (June 4, 2009); (addressing petitions for review of Boards' partial initial decisions in <i>Pilgrim</i> and <i>Vermont Yankee</i>)	204
<i>Pilgrim</i>	Pilgrim Watch's Petition for Review of LBP-06-848 [sic], LBP-07-13, LBP-06-23 and the Many Interlocutory Decisions in the Pilgrim Nuclear Power Station Proceeding (November 12, 2008)	CLL-10-11, 71 NRC ___ (March 26, 2010); (addressing certain issues in petition for review of Board's decisions) CLL-10-14, 71 NRC ___ (June 17, 2010); (addressing remaining issues in petition for review)	499(granted review of LBP-07-13, remanded limited issue to the Board) 582(decision on remaining issues)
<i>Prairie Island</i>	Northern States Power Company's Petition for Interlocutory Review of an Order Admitting a Safety Culture Contention (February 12, 2010) NRC Staff's Petition for Interlocutory Review of Atomic Safety and Licensing Board Decision Admitting Late-filed and Out of Scope Safety Culture Contention (February 12, 2010)	Decision pending on NRC Staff's and applicant's petitions for interlocutory review of Board's decision admitting a new contention	Pending

Name of Proceeding	Appeal	Description of Commission Decision	Time Elapsed Between Appeal and Commission Decision (days)
<i>Monticello</i>	Appeal of the North American Water Office to the November 1, 2005 Order of the Atomic Safety and Licensing Board Denying Standing and Rejecting Contentions of the North American Water Office in the Above Captioned Matter (November 11, 2005)	CLI-06-6, 63 NRC 161 (February 2, 2006)(addressing appeal of Board's denial of petition to intervene)	83
<i>Vermont Yankee</i>	Entergy's Petition for Interlocutory Review of LBP-06-20 Admitting New England Coalition's Contention 1 (October 10, 2006)	CLI-07-1, 65 NRC 1 (January 11, 2007)(addressing applicant's petition for interlocutory review of Board's grant of petition to intervene)	93
<i>Vermont Yankee</i>	Massachusetts Attorney General's Notice of Appeal and Brief on Appeal of LBP-06-20 (October 3, 2006)	CLI-07-3, 65 NRC 13 (January 22, 2007)(addressing petitioner's appeals of Boards' decisions in <i>Pilgrim</i> and <i>Vermont Yankee</i> denying petitions to intervene)	111
<i>Vermont Yankee</i>	Commonwealth of Massachusetts Petition for Review of LBP-08-25 and Request for Consolidated Ruling (December 2, 2008)	CLI-09-10, 69 NRC 521 (June 4, 2009) (addressing petitions for review of Boards' partial initial decisions in <i>Pilgrim</i> and <i>Vermont Yankee</i>)	184
<i>Vermont Yankee</i>	NRC Staff's Petition for Review of the Licensing Board's Partial Initial Decision, LBP-08-25 (December 9, 2008) New England Coalition's Petition for Review of the Licensing Board's Full Initial Decision, LBP-09-9 (July 23, 2009)	CLI-10-17, 72 NRC ____ (July 8, 2010)(addressing NRC Staff's and intervenor's petitions for review)	576(days between CLI-10-17 and December 9, 2008 petition for review) 350(days between CLI-10-17 and July 23, 2009 petition for review)

- A chart comparing the conduct of each proceeding compared to the Model Milestones listed in 10 CFR Part 2 Appendix B.

The following charts provide a comparison of the conduct of license renewal proceedings – ongoing and the ten most recently completed – to the Model Milestones in 10 C.F.R. Part 2, Appendix B (II). (For purposes of readability, the milestones have been broken into two charts.)

Chart 1: “Federal Register Notice” through “Ruling on Late-filed Contentions / Motions for Summary Disposition”

	Federal Register Notice	Ruling on Petitions	Initial Scheduling Order	Proposed Late-filed Contentions on SER and SEIS / Motions for Summary Disposition	Ruling on Late-filed Contentions / Motions for Summary Disposition; schedule set for remainder of proceeding
<i>Diablo Canyon</i>	75 Fed. Reg. 3493 (January 21, 2010)	Not yet issued (Model Milestone: June 10, 2010) 10 C.F.R. § 2.309(i) notice issued on May 4, 2010 (Board expects to issue a decision in or before July 2010)			
<i>Indian Point</i>	72 Fed. Reg. 55,834 (October 1, 2007)	The Board addressed petitions on a rolling basis from December 5, 2007 to July 31, 2008	February 4, 2009 (schedule provided in order summarizing prehearing conference) (Model Milestone: February 27 and	Draft SEIS DSEIS issued on December 22, 2008; late-filed DSEIS contentions submitted on February 27 and	DSEIS Rulings on late-filed DSEIS contentions issued on May 28, 2009 and June 16, 2009 (Model

	Federal Register Notice	Ruling on Petitions	Initial Scheduling Order	Proposed Late-filed Contentions on SER and SEIS / Motions for Summary Disposition	Ruling on Late-filed Contentions / Motions for Summary Disposition; schedule set for remainder of proceeding
		(Model Milestone: February 19, 2008) 10 C.F.R. § 2.309(i) notice issued on June 16, 2008)	September 24, 2008)	March 19, 2009 ² (Model Milestone: January 21, 2009) <u>SER with open items</u> SER with open items issued on January 15, 2009; no late-filed contentions on SER with open items submitted (Model Milestone: February 17, 2009) <u>SER</u> SER issued on August 11, 2009; no late-filed contentions on SER submitted (Model Milestone: September 10, 2009) <u>Final SEIS</u> FSEIS has not been issued	Milestone: March 17, 2009) Summary disposition Ruling on motions for summary disposition issued on November 3, 2009 (Model Milestone re SER: November 4, 2009) and April 22, 2010 (Model Milestone re DSEIS: March 17, 2009) Scheduling order The Board issued a revised schedule on July 1, 2010 (Model Milestone: final Staff review document has not been issued)

² To the extent other motions might have been filed at various times in the proceeding, they are not included in this chart. "The model milestones include only the most significant events in the proceeding" 10 C.F.R. Part 2, Appendix B (II).

	Federal Register Notice	Ruling on Petitions	Initial Scheduling Order	Proposed Late-filed Contentions on SER and SEIS / Motions for Summary Disposition	Ruling on Late-filed Contentions / Motions for Summary Disposition; schedule set for remainder of proceeding
<i>Monticello</i>	70 Fed. Reg. 25,117 (May 12, 2005)	November 1, 2005 (Model Milestone: September 9, 2005)	N/A (petition to intervene denied)	Summary disposition Motion for summary disposition filed on August 14, 2009 (Model Milestone re SER: September 10, 2009), and February 26, 2010 (Model Milestone re DSEIS: January 21, 2009)	N/A
<i>Oyster Creek</i>	70 Fed. Reg. 54,585 (September 15, 2005)	February 27, 2006 (Model Milestone: February 2, 2006) 10 C.F.R. § 2.309(i) notice issued on February 2, 2006	April 19, 2006 (Model Milestone: April 24, 2006)	Draft SEIS DSEIS issued on June 8, 2006; no late-filed contentions on DSEIS were submitted (Model Milestone: July 10, 2006) SER with open items SER with open items issued on August 18, 2006; late-filed contentions on SER	SER with open items Ruling on December 20, 2006 late-filed contentions issued on February 9, 2007 (Model Milestone: November 13, 2006) Scheduling order Final Scheduling Order issued on April 17, 2007 (Model Milestone, based on SER: June 25, 2007)

	Federal Register Notice	Ruling on Petitions	Initial Scheduling Order	Proposed Late-filed Contentions on SER and SEIS / Motions for Summary Disposition	Ruling on Late-filed Contentions / Motions for Summary Disposition; schedule set for remainder of proceeding
				with open items submitted on December 20, 2006 (Model Milestone: September 18, 2006)	
				SER Final SER issued on March 30, 2007; no late-filed contentions on SER were submitted (Model Milestone: April 30, 2007)	
				Final SEIS FSEIS issued on January 19, 2007; no late-filed contentions on FSEIS were submitted (Model Milestone: February 19, 2007)	
				Summary disposition No motions for summary disposition were filed in response to the SERs or SEISs	

	Federal Register Notice	Ruling on Petitions	Initial Scheduling Order	Proposed Late-filed Contentions on SER and SEIS / Motions for Summary Disposition	Ruling on Late-filed Contentions / Motions for Summary Disposition; schedule set for remainder of proceeding
<i>Palisades</i>	70 Fed. Reg. 33,533 (June 8, 2005)	March 7, 2006 (Model Milestone: October 26, 2005) 10 C.F.R. § 2.309(i) notices issued on November 14, 2005 and February 27, 2006	N/A (petition to intervene denied)	N/A	N/A
<i>Pilgrim</i>	71 Fed. Reg. 15,222 (March 27, 2006)	October 16, 2006 (Model Milestone: August 14, 2006) 10 C.F.R. § 2.309(i) notice issued on September 26, 2006	December 20, 2006 (Model Milestone: December 20, 2006)	Draft SEIS DSEIS issued on December 8, 2006; no late-filed contentions on the DSEIS were submitted (Model Milestone: January 8, 2007) <u>SER with open items</u> SER with open items issued March 1, 2007; no late-filed contentions on the SER with open items were submitted (Model Milestone: April 2, 2007)	<u>SER</u> Ruling on May 5, 2008 late-filed SER contention issued on July 1, 2008 (Model Milestone: September 21, 2007) <u>Scheduling order</u> The Board revised the schedule for the remainder of the proceeding on November 14, 2007 and December 19, 2007 (Model Milestone, based on FSEIS: October 22, 2007)

	Federal Register Notice	Ruling on Petitions	Initial Scheduling Order	Proposed Late-filed Contentions on SER and SEIS / Motions for Summary Disposition	Ruling on Late-filed Contentions / Motions for Summary Disposition; schedule set for remainder of proceeding
				<p>SER issued on June 28, 2007; late-filed contention on SER submitted on May 5, 2008 (Model Milestone: July 30, 2007)</p> <p>Final SEIS FSEIS issued on July 27, 2007; no late-filed contentions on FSEIS were submitted (Model Milestone: August 27, 2007)</p> <p>Summary disposition No motions for summary disposition were filed in response to the SERs or SEISs</p>	
<i>Prairie Island</i>	73 Fed. Reg. 34,335 (June 17, 2008)	December 5, 2008 (Model Milestone: November 4, 2008)	February 18, 2009 (Model Milestone: January 29, 2009)	<p>Draft SEIS issued on November 16, 2009; late-filed contentions on DSEIS submitted</p>	Draft SEIS Rulings on December 14, 2009 DSEIS contentions issued on February 25, 2010

	Federal Register Notice	Ruling on Petitions 10 C.F.R. § 2.309(i) notice issued on October 31, 2008	Initial Scheduling Order	Proposed Late-filed Contentions on SER and SEIS / Motions for Summary Disposition	Ruling on Late-filed Contentions / Motions for Summary Disposition; schedule set for remainder of proceeding
				on December 14, 2009 (Model Milestone: December 16, 2009) SER with open items SER with open items issued on June 4, 2009; no late-filed contentions on SER with open items were submitted (Model Milestone: July 6, 2009) SER SER issued on October 16, 2009; late-filed contention on SER submitted on November 23, 2009 (Model Milestone: November 16, 2009) Final SEIS FSEIS has not been issued <u>Summary disposition</u>	(Model Milestone: February 9, 2010) SER Ruling on November 23, 2009 SER contention issued on January 28, 2010 (Model Milestone: January 11, 2010) <u>Scheduling order</u> The Board amended the hearing schedule on March 23, 2010 and April 20, 2010 (Model Milestone: final Staff review document has not been issued)

	Federal Register Notice	Ruling on Petitions	Initial Scheduling Order	Proposed Late-filed Contentions on SER and SEIS / Motions for Summary Disposition	Ruling on Late-filed Contentions / Motions for Summary Disposition; schedule set for remainder of proceeding
<i>Shearon Harris</i>	72 Fed. Reg. 13,139 (March 20, 2007)	August 3, 2007 (Model Milestone: August 7, 2007)	N/A (petition to intervene denied)	No motions for summary disposition were filed in response to the SERs or DSEIS N/A	N/A
<i>Susquehanna</i>	71 Fed. Reg. 64,566 (November 2, 2006)	March 22, 2007 (Model Milestone: March 22, 2007)	N/A (petition to intervene denied)	N/A	N/A
<i>Vermont Yankee</i>	71 Fed. Reg. 15,220 (March 27, 2006)	September 22, 2006 (Model Milestone: August 14, 2006) 10 C.F.R. § 2.309(i) notice issued on September 5, 2006	November 17, 2006 (Model Milestone: November 16, 2006)	Draft SEIS issued on December 13, 2006; no late-filed contentions on DSEIS were submitted (Model Milestone: January 12, 2007) SER with open items SER with open items issued on March 30, 2007; no late-filed contentions on SER with open items were submitted (Model Milestone: April 30,	Scheduling order The Board revised its scheduling order on December 13, 2007 (Model Milestone, based on SER: May 20, 2008)

	Federal Register Notice	Ruling on Petitions	Initial Scheduling Order	Proposed Late-filed Contentions on SER and SEIS / Motions for Summary Disposition	Ruling on Late-filed Contentions / Motions for Summary Disposition; schedule set for remainder of proceeding
				<p>2007)</p> <p><u>SER</u> SER issued on February 25, 2008; no late-filed contentions on SER were submitted (Model Milestone: March 26, 2008)</p> <p><u>Final SEIS</u> FSEIS issued on August 1, 2007; no late-filed contentions on FSEIS were submitted (Model Milestone: August 31, 2007)</p> <p><u>Summary disposition</u> No motions for summary disposition were filed in response to SERs or SEISs</p>	

Chart 2: "Completion of Updates to Mandatory Disclosures" through "Issuance of Initial Decision"

	Completion of Updates to Mandatory Disclosures	Motions for Summary Disposition	Written Direct Testimony Filed	Evidentiary Hearing Begins	Issuance of Final Initial Decision
<i>Diablo Canyon</i>					
<i>Indian Point</i>					
<i>Monticello</i>	N/A	N/A	N/A	N/A	N/A
<i>Oyster Creek</i>	May 11, 2007 (Last scheduled update) (Model Milestone: April 24, 2007) (Last Board ruling on late-filed contentions issued on April 10, 2007)	Motion for summary disposition filed (although not filed in response to SERs or SEISs) on March 30, 2007 (Model Milestone, based on SER: July 23, 2007) (Final Staff review document (here, the SER) issued on March 30, 2007)	July 20, 2007 (Model Milestone, based on SER: September 4, 2007)	September 24, 2007 (Model Milestone, based on SER: September 21, 2007)	December 18, 2007 (Model Milestone: January 28, 2008) (The Board issued an order closing the record on October 29, 2007)
<i>Palisades</i>	N/A	N/A	N/A	N/A	N/A

	Completion of Updates to Mandatory Disclosures	Motions for Summary Disposition	Written Direct Testimony Filed	Evidentiary Hearing Begins	Issuance of Final Initial Decision
<i>Pilgrim</i>	March 7, 2008 (Last update) (Model Milestone: July 15, 2008) (Last Board ruling on late-filed contentions issued on July 1, 2008)	Motions for summary disposition filed (although not filed in response to SERs or SEISs) on May 17, 2007 and June 8, 2007 (Model Milestone, based on FSEIS: November 19, 2007) (Final staff review document (here, the FSEIS) issued on July 27, 2007)	January 9, 2008 (applicant); January 29, 2008 (NRC Staff); March 3, 2008 (intervenor) (Model Milestone, based on FSEIS: December 31, 2007)	April 10, 2008 (Model Milestone, based on FSEIS: January 18, 2008)	October 30, 2008 (On September 2, 2008, the Board issued a notice that it would not meet the Model Milestone) (Model Milestone: September 2, 2008) (The Board issued an order closing the record on June 4, 2008)
<i>Prairie Island</i>					
<i>Shearon Harris</i>	N/A	N/A	N/A	N/A	N/A
<i>Susquehanna</i>	N/A	N/A	N/A	N/A	N/A

	Completion of Updates to Mandatory Disclosures	Motions for Summary Disposition	Written Direct Testimony Filed	Evidentiary Hearing Begins	Issuance of Final Initial Decision
Vermont Yankee	<p>July 15, 2008 (Last update)</p> <p>(Model Milestone: November 21, 2007)</p> <p>(Last Board ruling on late-filed contentions issued on November 7, 2007)</p>	<p>Motions for summary disposition (although not filed in response to SERs or SEISs) on April 19, 2007 and June 5, 2007</p> <p>(Model Milestone, based on SER: June 19, 2008)</p> <p>(Final Staff review document (here, the SER) issued on February 25, 2008)</p>	<p>April 28, 2008 (intervenor); May 13, 2008 (applicant and NRC Staff)</p> <p>(Model Milestone, based on SER: July 29, 2008)</p>	<p>July 21, 2008</p> <p>(Model Milestone, based on SER: August 18, 2008)</p>	<p>July 8, 2009 (Full Initial Decision); November 24, 2008 (Partial Initial Decision)</p> <p>(Model Milestone, based on end of evidentiary hearing: October 22, 2008)</p> <p>(Because it is unclear when the Board officially closed the record, the Model Milestone is based on the end of the evidentiary hearing)</p>

3. **The Commission's Statement of Policy on the Conduct of Adjudicatory Proceedings states that "applicants for a license are entitled to a prompt resolution of disputes concerning their applications." What steps has the Commission taken to ensure that its appellate decision-making is consistent with this policy?**

The Commission may take action at any time in individual proceedings, as appropriate, to provide guidance to the boards and parties, and to decide issues in the interest of a prompt and effective resolution of matters set for adjudication.

When an adjudicatory matter (such as an appeal) is before the Commission itself, the time needed for the consideration and resolution of that matter will be informed by a number of factors, including the nature of the legal and/or factual issues that must be decided. These issues may vary widely not only in number, but also in legal and technical complexity, the procedural posture of the case, and the scope of the underlying record to be considered. Further, these matters must be prioritized, taking into account other pending adjudications and the balance of the Commission's considerable workload – the adjudication of legal matters is only one of the Commission's many responsibilities. With this in mind, as mentioned above, the NRC's rules of procedure provide broad latitude for the Commission to take action in individual proceedings to ensure prompt and effective resolution of matters set for adjudication.

4. Do external influences, such as the perception that a proceeding is "high profile" or "controversial," cause the Commission to delay its appellate decisions?

No. The Commission's voting process for adjudicatory matters is not influenced by external factors. The Commission's adjudicatory priorities – both when it acts in adjudicatory matters itself, and in monitoring the activities of the ASLB – are informed by the agency's stated goals for completing a review – for example, in the case of a license renewal application, within 30 months of receipt, if a hearing is required. Some cases may exceed the stated goals, based on the complexity of the contested issues and the interests of the parties. However, as the Commission stated in its 1998 Statement of Policy on Adjudicatory Proceedings (CLI-98-12, 48 NRC 18), the Commission "intends to promptly respond to adjudicatory matters placed before it, and such matters should ordinarily take priority over other actions before the Commissioners."

5. If the nation's nuclear power plant operators cannot have confidence in the NRC's adherence to schedules in established proceedings, such as license renewal applications, how do you expect them to invest billions in new plants?

As an independent regulatory agency, the NRC's role is neither to promote nuclear power nor promote investment in nuclear power. In this role, the agency is committed to conducting its work in an efficient, transparent, and predictable fashion. With respect to license renewal, the NRC has issued renewed licenses for 59 of the 104 reactors in the United States. Over a ten-year period, the NRC has taken longer than its posted 30-month schedule for only four license renewal applications. Each of those involved a contested hearing on complex issues to ensure that the right safety decisions were made. License renewal applicants – if they were timely in submitting their applications – continue to operate during the pendency of NRC's review and any legal proceedings associated with the license renewal application. Although applicants for new plants must await Commission approval before beginning construction activities, an independent review of the NRC's new reactor licensing process by the Bipartisan Policy Center found that the NRC is not seen as having needlessly delayed or extended decisions regarding the new reactor licensing process.

Senate Environment and Public Works Committee Hearing

May 5, 2010

Supplemental Responses of Commissioners Svinicki, Apostolakis, Magwood, and Ostendorff to Follow-Up Questions for Written Submission

Senator Thomas R. Carper

- 4. Openness has rightfully been a key priority of the NRC. However, what do you believe is the appropriate level of openness related to voting deliberations?**

As reflected in the response dated July 11, 2010, openness is vital to the Commission's deliberative process. We will continue to look for ways to enhance the transparency of our deliberations and our public discussions. In addition to productive, open dialogue between the Commission, its staff, and external stakeholders, the Commission's internal procedures provide for a well documented decision-making process through a written voting record called the notation voting process. This process has served the Commission well over the years, and provides several benefits. First, it gives each Commissioner an opportunity to explain his or her rationale behind each vote. Second, the notation voting process preserves the decision-making record for historical reference, thus contributing to regulatory stability and to understanding the Commission's prior positions. Finally, the notation voting process also allows each Commissioner to carefully analyze the agency's highly-technical issues.

Senator James M. Inhofe

- 27. Chairman Jaczko, in response to my question regarding target schedules for Commission action on COL applications, you indicated that the license approval process is a staff action and that in a contested proceeding, the issuance of the Atomic Safety and Licensing Board's final decision is the final action for licensing. You also stated that if there is no contested proceeding, the Commission will conduct a mandatory hearing for which there is currently no target schedule.**

At the hearing, all Commissioners were questioned about the mandatory hearing process. In addition to the Chairman's response provided on July 11, 2010, we would like to expand on three additional points.

- b. Can a COL be issued before the Commission has issued a favorable decision on the mandatory hearing?**

The July 11, 2010 response noted that the Commission is currently reviewing the actions that it will take in a mandatory hearing. Additionally, we note that the mandatory hearing

requirement stems from section 189a of the Atomic Energy Act. Under the Commission's existing process, a favorable decision on the mandatory hearing is a prerequisite for issuance of a COL.

- c. **If the Commission must make a decision on the mandatory hearing before a COL can be issued, do you agree that the Commission has a role in the issuance of a COL?**

Issuance of the license itself is an NRC Staff action. But as stated above, a favorable Commission decision on the mandatory hearing is required before a COL may be issued. Therefore, we agree that the Commission has a role in the issuance of a COL.

- d. **Is the Commission considering adopting a target schedule for the completion of the mandatory hearing and issuance of a Commission decision?**

The Commission fully understands the interest various stakeholders have in assuring that the agency conducts mandatory hearings in a predictable manner. As part of the Commission's current deliberations on finalizing the procedures for the conduct of mandatory hearings, we will consider adopting target schedules or milestones for completion of these hearings and issuance of a Commission decision.

Senator CARPER. Mr. Chairman, thank you very much.
Commissioner Svinicki, please proceed.

**STATEMENT OF HON. KRISTINE L. SVINICKI, COMMISSIONER,
U.S. NUCLEAR REGULATORY COMMISSION**

Ms. SVINICKI. Thank you.

Good morning, Chairman Carper, Senator Inhofe and members of the Subcommittee. I appreciate the opportunity to appear before you to discuss the NRC's principles of good regulation and how the NRC is meeting these principles.

Originally issued by the Commission in 1991, the principles are intended as a guide to agency decisionmaking and the individual conduct of NRC employees. They are described as fundamental guideposts in ensuring the quality, correctness and consistency of our regulatory activities. I believe these principles articulate the standards by which the regulated community and the broader public should judge the NRC as a regulator charged with ensuring the public trust.

The first principle, that of independence, calls for the highest possible standards of ethical performance and professionalism but notes that independence does not imply isolation. All available facts and opinions must be sought openly. Conflicting public interests must be considered, and final decisions must be based on objective, unbiased assessments of all information, and documented with reasons explicitly stated.

The second principle, openness, describes nuclear regulation as the people's business. The public must have the opportunity to participate in regulatory processes and open channels of communication must be maintained.

The third principle, that of efficiency, notes that the American taxpayer, the rate paying consumer and licensees, are entitled to the best possible management and administration of regulatory activities, which should also be consistent with the degree of risk reduction that they achieve. Regulatory decisions should be made without undue delay.

The fourth principle, clarity, calls for regulations that are coherent, logical and practical. Agency positions should be readily understood and easily applied.

The fifth and final principle, reliability, states that regulatory actions should always be fully consistent with regulations and should be promptly, fairly and decisively administered so as to lend stability to the nuclear operational and planning process. Most importantly, this principle supports the objective that once established, regulations should be perceived to be reliable and not unjustifiably in a state of transition.

In issuing the principles of good regulation, the NRC has offered to be judged against them. Where we fall short, the Congress and the public should challenge us to do better, as they sometimes have. Where we can further improve an already good process, we should seek to do that as well.

I appear before you this morning for the first time alongside the three new Commissioners to whom the Senate gave its unanimous support. I am honored to have colleagues of such caliber join the Commission and look forward to working with each of them. I am

also grateful for this Subcommittee's sustained interest in and support of the important work of the NRC.

When I sat before this Committee for my nomination hearing, the Senators described for me the many issues and concerns that would face the NRC in fulfilling its responsibilities. With 2 years of service now behind me, I can report to you that I have a deep appreciation for the complexity of issues facing the NRC. Addressing the agency's current significant workload and doing so while fulfilling our principles of good regulation is a real and significant challenge.

The work before us will require the best efforts that we have to apply to it, both from the NRC staff and from the Commission itself, but the public and the importance of our mission demand no less.

Thank you.

Senator CARPER. Thank you, Ms. Svinicki.

Commissioner Apostolakis, please proceed.

**STATEMENT OF HON. GEORGE APOSTOLAKIS, COMMISSIONER,
U.S. NUCLEAR REGULATORY COMMISSION**

Mr. APOSTOLAKIS. Good morning, Chairman Carper and members of the Subcommittee. I thank the Committee for supporting my confirmation as Commissioner. I was sworn in on April 23 and I have been on the job for all of 7 days.

I also thank you for holding today's meeting to examine the NRC's core principles of good regulation and how the NRC is meeting these principles in licensing new reactors and oversight processes for the current nuclear fleet.

I would like to add a few thoughts about the ways in which risk information contributes to these core principles. Risk information has been crucial in the development of a successful reactor oversight process for the current fleet. It focuses our attention on items important to safety and allows us to respond to inspection findings in a way that is commensurate with their safety significance. This process has clearly contributed to openness, efficiency and clarity.

We are currently considering proposals for the development of risk informed and performance based revisions to the oversight process for fuel cycle facilities. Thus, the Commission may be able to advance the principles of good regulation through greater use of risk information and analysis in the oversight of these facilities also.

In the context of licensing new reactors, an important activity that deserves to be mentioned is the interaction of our staff with the Department of Energy to develop a licensing plan for the next generation nuclear plant. As reported to Congress in 2008, this licensing process is to be risk informed and performance based to the extent justified by the quality and completeness of the associated Next Generation Nuclear Plant (NGNP) design specific probabilistic risk assessment. This effort is to be a significant step toward meeting the direction of the Energy Policy Act to "develop risk based criteria for any future commercial development of a similar reactor architecture."

It could also contribute to the development of a technology neutral licensing process which would make future licensing more effective and efficient.

Thank you very much, gentlemen.

Senator CARPER. Thank you, Mr. Apostolakis.

Commissioner Magwood, welcome. Please proceed.

**STATEMENT OF HON. WILLIAM D. MAGWOOD, IV,
COMMISSIONER, U.S. NUCLEAR REGULATORY COMMISSION**

Mr. MAGWOOD. Good morning, Mr. Chairman and members of the Subcommittee. I am pleased to join you today as a member of the U.S. Nuclear Regulatory Commission. I thank you for your support during my recent confirmation, and I wanted you to know that my colleagues and I have been working as a team. As a matter of fact, Commissioner Ostendorff and I were sworn in at a joint ceremony on April 1 as a symbol of our joint activities together. And actually, we are planning to take a trip together next week.

This Commission comes together at a time when the Nation's interest in expanded use of nuclear energy is at a new high, and the agency's workload has increased substantially. In addition to our existing responsibilities for overseeing nuclear power plants, the NRC is actively reviewing combined license applications for 22 new reactors, 19 operating reactors are getting new license renewals, and applications for power upgrades at 16 plants across the country are currently under review.

We as a Commission would be unable to address these crucial issues without the dedicated and talented staff at NRC. Since my confirmation, I have had the opportunity to meet with many of the staff and been impressed by the breadth of their experience, the depth of their commitment to public health and safety. With this panel's support, Chairman Jaczko and his immediate predecessor, former Chairman Klein, have presided over a very substantial expansion of the agency staff that will enable us to meet our responsibilities in a timely manner.

In addition, I applaud Chairman Jaczko's efforts to guide this increase in staff while helping to ensure the agency makes no compromises on our Nation's high standards for safety, security and environmental protection.

In my brief time with the Commission, I have come to believe that the development of strong safety cultures is an essential element for the success of all NRC licensees. Without a strong safety culture, even the best technology can fail to protect the safety of workers, the public and the environment.

Management at both power reactors and materials licensees must continually focus on creating the right type of work environment, one that is open and collaborative and allows employees to voice dissenting views, which by the way, Senator Voinovich, is a value that Commissioner McGaffigan emphasized during his tenure. I hope to make development of increasing safety cultures a central theme of my tenure on the Commission.

Finally, Mr. Chairman, I would like to inform you that I have decided to publish the calendar of my meetings with external groups such as utilities and nongovernmental organizations on a monthly basis on the agency's Web site. While this information can be illu-

minating, this raw data about which groups with which a Commissioner meets can be easily misunderstood and mischaracterized. Because of these risks, I neither encourage my fellow Commissioners to take this step, nor do I wish my decision to be viewed as a precedent.

However, as the Commissioner who created the Nuclear Power 2010 program in a previous position with the Government, I feel I have a special obligation to provide this extra measure of transparency.

With that, I thank you for your time and look forward to answering any questions you have today.

Thank you.

Senator CARPER. Thank you, Mr. Magwood.

Commissioner Ostendorff, welcome. Please proceed.

**STATEMENT OF HON. WILLIAM C. OSTENDORFF,
COMMISSIONER, U.S. NUCLEAR REGULATORY COMMISSION**

Mr. OSTENDORFF. Thank you, Mr. Chairman, Senator Inhofe, members of the Subcommittee, for the opportunity to be here today.

I also thank the Committee for its support in the confirmation process. I applaud the Committee's objective to discuss NRC's core principles of regulation and how NRC is meeting these principles in the licensing process.

I have been a Commissioner for just over 1 month. In that time, I have had the chance to get out in the field and visit various locations. I have seen NRC staff at the headquarters in Rockville, Maryland.

Senator CARPER. Mr. Ostendorff, would you bring that microphone just a little closer to your lips please. Thanks.

Mr. OSTENDORFF. Is that better?

Senator CARPER. That is just fine. Thanks.

Mr. OSTENDORFF. I am sorry.

I have visited Region I up in King of Prussia, Pennsylvania; Region II in Atlanta; and the Technical Training Center in Chattanooga.

Since I am a newcomer to the commercial nuclear industry, I have made the effort to get out by visiting regulated facilities. I have gone to two power reactors at Watts Bar Unit 1 in Tennessee; Hope Creek in New Jersey; a power reactor under construction at Watts Bar Unit 2; a research reactor at the University of Rhode Island; a blood irradiator facility in Providence, Rhode Island; and a commercial food irradiator in New Jersey.

I would like to share some very brief observations of my impressions from those visits. From what I have observed, the NRC's principles of good regulation are being followed. However, it is important to avoid complacency, as you have noted, and it is important to continuously focus on improvement.

I have been very impressed with NRC staff. The resident inspectors, project managers, technical reviewers, operator license examiners, and managers that I have met have demonstrated high levels of competence, enthusiasm and commitment to the NRC's mission.

I have also observed a very open and collaborative work environment from thoughtfully taking lessons learned and using them to improve the agency. It is evident that the NRC invests in its people, and I am honored to part of that team.

With over 31 years of Federal service, including military experience, experience with the House Armed Services Committee and Department of Energy, in comparison, my initial impression is the NRC is very open in how it performs its regulatory functions. The NRC goes to great lengths to make our documents publicly available via the Web sites, to listen to views of external stakeholders during meetings, and to communicate the basis of our activities to the public and other parties.

I would like to note how professional the NRC team has worked and evolved its existing reactor oversight process using stakeholder feedback and lessons learned.

Therefore, I am confident that in a similar fashion, the NRC and its staff will capture feedback and lessons learned, including the insights provided by the Bipartisan Policy Center to improve the NRC's processes for licensing new reactors.

In closing, I again thank the Subcommittee for its support. I look forward to answering your questions.

Senator CARPER. Thanks very much, Captain Ostendorff. Nice to have you on board today.

Looking over your left shoulder, I see a fellow that I think Senator Sanders and I once served with for a number of years in the House, Jim Saxton sitting down in the front row.

Congressman Saxton, it is very nice to see you, and welcome.

I want to start off by just asking a quick question. Don't spend a lot of time on this, but how are the five of you coming together as a team?

We will just start, Commissioner Ostendorff, with you. How are you all coming together as a team? Three new people. We think it is an excellent, excellent line up of Commissioners, but how is it coming together?

Mr. OSTENDORFF. I think it is coming together very well, Mr. Chairman. We meet one on one to share views with each other on a weekly basis. We also have had probably two meetings a week in a public setting to discuss issues after receiving briefings by the staff, and I think we are off to a great start.

Senator CARPER. Good.

Mr. Magwood.

Mr. MAGWOOD. Mr. Chairman, I am quite pleased with the way we have worked together so far. We have coordinated very closely on several important issues. As Commissioner Ostendorff mentioned, we meet together on a one on one basis on a very regular basis. There is lots of traffic back and forth between our offices. And our staffs also work very well together.

As a matter of fact, I also wanted to thank Commissioner Svinicki and Chairman Jaczko for the help they have provided in getting my staff and myself up to speed with how to operate in the environment of the NRC.

So I think it is going very well.

Senator CARPER. Good. Thank you.

Dr. Apostolakis.

Mr. APOSTOLAKIS. Mr. Chairman, I second what my two colleagues just said.

Senator CARPER. Thank you.

Commissioner Svinicki.

Ms. SVINICKI. As I noted, the caliber of my colleagues is very impressive, and I appreciate the Committee's recognition that a five-person Commission functions best. Procedures are always optimized around a certain number, and a full Commission I think most effectively moves the business forward. So thank you.

Senator CARPER. Good.

Chairman Jaczko.

Mr. JACZKO. Well, I would agree with everything that has been said.

Senator CARPER. Thank you.

Recently, we have seen several nuclear power plants reporting tritium leaks. And I believe that these leaks were found because the plants were participating in what I think was a voluntary monitoring program. I would like to ask, is that correct? Are they participating in a voluntary monitoring program?

And second, do you think the voluntary monitoring program is working?

Mr. JACZKO. Mr. Chairman, plants are required to monitor releases of radioactive materials on a regulatory basis by the NRC. But in an effort to do a better job of earlier detection of leaks of tritium that don't necessarily have an impact on public health and safety, the industry initiated a program several years ago to begin more actively monitoring releases of material on the reactor sites themselves.

So from a regulatory perspective, they are required to monitor very closely their releases off the reactor site, but onsite, they have now an enhanced voluntary program to monitor these releases.

I think the impact has been much greater openness, much greater awareness of the real risks that are out there. And what we have seen is with all of these leaks, they have not posed a threat to public health and safety. They have not posed an immediate threat to the safe operation of the facilities.

So right now, I think we have a good program in place, but I think consistent with the principles of good regulation, the agency is moving forward to look at lessons learned to see if there are things we can do to enhance this program. And so the staff established a task force to look at tritium and see if there are other ways to deal with some of these situations, and we are anticipating that task force will be publishing their findings in the coming weeks. And I think that will provide some interesting information for the Commission to look at, possibly some policy issues to address, and perhaps some changes in our practices.

Senator CARPER. Good.

Any other Commissioners, please feel free to add to those comments.

OK.

For new license applications, what concretely can we do to ensure that the next tranche of applications is processed a bit more smoothly? The Bipartisan Policy Center study will be represented here later in the second panel. The Bipartisan Policy Center study

suggests that the new licensing process will improve over time, and we hope that is true.

Could you all talk with us just for a little bit about how the NRC might apply lessons learned to date and to increase clarity for applicants?

Mr. JACZKO. Mr. Chairman, after the Bipartisan Policy Center report came out, I asked the staff to be prepared to look at lessons learned from the current process to see if there are ways that we can make enhancements and improvements, while still maintaining the right focus on safety and security.

We don't want to do that at this point because it would be a little bit like trying to change the tires on a car that is driving down the highway at 80 miles an hour. So we want to get through this current wave and complete our reviews, and then really be able to take a good look at lessons learned.

But there is clearly one issue that stands out right now that I think has been driving most of the schedules and most of the activities, and that has to do with the actual design review work itself. The agency in the late 1980s and early 1990s established a new process that would change the way licensing was done. And one of the enhancements to that was to allow vendors to separately have a design approved irrespective of a particular site application. And right now it is really that design work that is providing most of the bulk of the work and most of the time of the activity from the staff, as well as from the vendor.

So I think the biggest enhancement that we will have after this first wave is completed is that we expect that some of these designs will be approved, and then those designs will be finalized and then the licensees would have the ability for future construction to turn to some of those existing designs, which should significantly simplify the process of new reactor licensing.

Senator CARPER. Thank you.

Any other Commissioners want to briefly comment as well?

Ms. Svinicki.

Ms. SVINICKI. Just as a very brief supplement to what Chairman Jaczko stated. At the NRC staff level, I want to give them credit that they are looking at this as they are moving reviews along right now. Albeit modest, there are efficiency gains. They are looking at whether there are things that can be done in parallel instead of series. Already, even prior to my arrival on the Commission, they have been able to squeeze a few months out of the schedule.

So at the working level, they are looking at it constantly.

Senator CARPER. Good. Thank you.

Dr. Apostolakis.

Mr. APOSTOLAKIS. I support my colleagues. I agree with what Chairman Jaczko said. I just want to point out that we do have a case where this process was implemented and very successfully. The staff put together a so-called GALL Report, Generic Aging Lessons Learned report, after the first two or three reviews of applications for license renewals. That was considered universally as a major milestone, and people use it extensively.

So I believe putting together a report like this after the first maybe one or two or three license applications have been approved

would be, I mean, we have a precedent that we can do that. Thank you.

Senator CARPER. Good. Thanks very much. OK.

Mr. Magwood, did you want to make a comment, just very briefly, Mr. Magwood? Then Mr. Ostendorff.

Mr. MAGWOOD. Just a very brief comment. I agree with my colleagues on this issue. I make an observation that before we performed the first license renewal there was a lot of concern about how long it would take and how complicated the process would be. I think that the experience that was gained especially after the first few shows that it is now a very stable process, highly predictable process. I think it is one that shows that the agency does learn lessons as it goes forward. I fully expect that will be the same story with COL applications.

Senator CARPER. Good. Thank you.

Mr. Ostendorff.

Mr. OSTENDORFF. I would just add one anecdote. Last Friday, I was in a briefing with NRC staff at headquarters. About eight staff were there from the Licensing Division. I was impressed with the demographic spread. Some people had been there 30 years. Some people had been there 5 years and in between. I was heartened to see the mentorship coaching going on to capture those past experiences, to bring them to the present day.

Senator CARPER. Good. Thank you.

OK, I have used about 8 minutes, and I will ask each of my colleagues, you are entitled to 8 minutes, so have at it.

You are recognized, Senator Inhofe.

Senator INHOFE. Let me first of all say to Commissioner Ostendorff, I was with your son actually at Fort Sill, I think it was last Friday, and I just want everyone to know that you come from a military family. You have had experiences with nuclear submarines personally. Your son, the Captain, was injured I guess in Iraq and had to have reconstructive surgery, so we all wish him the very best.

Since you did have that experience, I think it was Senator Alexander who talked about our background and the experience we have had with nuclear submarines. Would there be any comments you want to make in terms of safety that would draw from your own personal experience?

Mr. OSTENDORFF. I would say, Senator Inhofe, it was high level. Just by comparison, when I took command of a submarine back in 1992, USS *Norfolk*, it was a Los Angeles class nuclear attack submarine. I was in command for 3 years. And at that time, there were 55 other submarines in that same class in the United States Navy.

A problem or material issue identified with one component in that plant was pretty well understood because of the commonality across the other submarines in the fleet. By way of comparison to what I am seeing here in my very brief time in the NRC, I would say the degree of difficulty, whether you are using a gymnastics or diving experience in the Olympics, the degree of difficulty of this effort with NRC staff I think quite frankly is much more complex than my military experience in the Naval Reactors Program. So it

is going to take I think a bit longer time than what I was used to in a different setting.

That said, I think the same core competence, qualification, due diligence principles I saw in the Naval Reactors Program are clearly evident in the NRC's processes.

Senator INHOFE. Thank you very much.

Commissioner Magwood, both you and Commissioner Svinicki talked about the successes, really, in the 59 reactors' renewals that have taken place. And I think it was you, Commissioner, who made reference to the fact that it was slow at first, and it got better. That happened right after we started doing the oversight in 1997. And I looked at that, and appreciate the fact that you both brought that up, because that is kind of a model that I would like to see take place in terms of new licenses.

Commissioner Svinicki, you talked about the successes of the NRC at the working level and the fact that it is more predictable now. They have been able to get a lot of these things done. I am thinking now on the Commission level. I talked to Commissioner Jaczko in my office about trying to come up with some guidelines, some kind of predictability on what we would be able to do at the Commission level.

Now, the Commission level for final approval is a step that should be done, as I understand the process, fairly rapidly. All of the real hard work is done at the working level that you referred to. So I would like to have each one of you give me an idea is there any way you can get together and come up with something and say, it is going to take approximately this long once the working level is done, and it comes to the Commission for final approval.

Recognizing unforeseen things can happen. I understand that. But so that we would have some idea, not just we, but people who are looking for financing, people who are looking for support, would have some general idea about to look forward to.

Let's start on this side with Commissioner Ostendorff. Do you think that you could get your heads together and come up with something that would be a target for performance at the final Commission level?

Mr. OSTENDORFF. Senator, that is a very insightful question. I would comment that we have been briefed on, and I am aware of the milestone targets for how long it takes to review a design certification, combined operating license, and early site permit. Those are three of the key processes for a new construction plant.

I am aware, and the Chairman has mentioned that he has asked us, the staff, to take a hard look at what lessons learned and efficiencies, as Commissioner Svinicki mentioned, might be achieved early on at appropriate steps.

And so I just would commit to you I will engage with my other Commissioner colleagues to have that discussion and get back to you.

Senator INHOFE. OK.

Would you agree with that, Commissioner Magwood?

Mr. MAGWOOD. Absolutely. I have already spent some time thinking about this, and I expect to spend a lot more time thinking about it as we go forward.

I would add one cautionary note to this, which is it is so important to get these first plants.

Senator INHOFE. Which was also the case in the renewals.

Mr. MAGWOOD. Absolutely. Doing it right is really the most important thing that I am focused on. So I am watching those processes very closely. But the question you asked is an absolutely essential question we should face and is one I am giving a lot of thought to.

Senator INHOFE. All right. That is good.

Well, I think it is a good time to do that in that we have almost a new Commission here, so you are not encumbered by things in the past that made it more difficult.

Yes, sir.

Mr. APOSTOLAKIS. I fully agree with my colleagues that this is a very good idea.

Senator INHOFE. OK. Good.

Ms. SVINICKI. Senator Inhofe, after you raised this issue I believe at the nomination hearing of my colleagues, I found it thought provoking, and I went back and looked more closely at our posted schedules for the new reactor reviews. I noticed just what you had remarked upon, which is that our schedules do not include the steps at the very end that have Commission action. There is no predicted time line.

I was pondering why that was, and the best I can think of is that there was a rush of applications that came in in 2007 and 2008. I think that the focus at that time was on the environmental review and the safety review and publishing the schedules for those.

But speaking only for myself, I am hard pressed now to say that if we are in 2010 and some of these documents now will be issued in 2011 and 2012, it may be that the time is right—and you mentioned that the Commission has had a significant change in membership—that as a Commission we should get together and look at what kind of schedule predictions that we can put out there. Of course, we would keep in mind that they are dependent on all of the steps prior to that being fulfilled on time.

The cautionary note you mention is that we need to be careful about making sure that people understand that the estimate is predicated on a lot of other things. But I, candidly in reading your remarks, I have to say that I found a lot of logic in them. If in 2008 we weren't ready, maybe we need to be ready now to send some public signal about schedules.

Senator INHOFE. I appreciate that very much. Thank you.

Mr. JACZKO. Senator, I would love to share my understanding on the process of how the Commission approves licenses for new reactors. The license approval process is actually a staff action. So once the staff issues its final documentation, there actually is a schedule for completion of activities. If there is a contested hearing in the process, so if there are parties who have engaged through the hearing process and gotten submittal of a contention, there are milestones in our rules and regulations that establish when the board is required to complete its work.

So those are triggered, for instance, to completion of the staff review of the final evaluation report, which is the safety review the staff does. So once that document is complete, then those board

milestones pick up again and have targets for completion of the board's work.

Once the board issues its final decision, whether or not there is a contested proceeding, that is the final action for licensing, pending any appeals to the Commission itself. When the Commission revised our regulations in Part 52, which is the regulation that covers the procedure for the reactor licensing, the Commission actually at that time removed the provision in the procedures which would require those decisions to actually come in front of the Commission.

So in the past, there was a required step where the Commission had to approve affirmatively the staff licensing action. That was actually removed. So the point that the board issues the decision, again pending appeals, that decision is final. Those decisions would go on while the license was issued.

Now, with or without no contested hearing, then the Commission work that actually has to be done is what is called the mandatory hearing, which is an activity that the Commission agreed that the Commission would take on itself. That is something that arguably we don't currently have a schedule to complete. I have proposed a meeting to the Commissioners for later in July to begin working out how we would establish the schedule and how we would actually work through completing that mandatory hearing.

Senator INHOFE. OK. I would just like to have all five of you get together and address this and maybe come back. I am specifically talking about now the final Commission activity.

Thank you, Mr. Chairman.

Senator CARPER. You are quite welcome.

Senator Sanders, you are recognized. Please proceed.

Senator SANDERS. Thank you very much.

Senator CARPER. And we will have a second round, so we will have another chance to ask more questions.

Senator SANDERS. Thank you very much, Mr. Chairman.

I would like to put into the record an Associated Press article, February 1, 2010, headline: "A quarter of U.S. nuclear plants leaking: 27 of 104 plants leak radioactive tritium, a carcinogen, raising concerns about Nation's aging plants."

First paragraph: "Radioactive tritium, a carcinogen discovered in potentially dangerous levels in groundwater at the Vermont Yankee Nuclear Plant now taints at least 27 of the Nation's 104 nuclear reactors, raising concern about how it is escaping from the aging nuclear plants."

Senator CARPER. Without objection, it will be made part of the record.

Senator SANDERS. Yes, thank you.

[The referenced information follows:]

MONTPELIER, Vt., Feb. 1, 2010

A Quarter of U.S. Nuclear Plants Leaking

27 of 104 Plants Leak Radioactive Tritium, a Carcinogen, Raising Concerns About Nation's Aging Plants



The cooling towers of Three Mile Island's Unit 1 Nuclear Power Plant pour steam into the sky in Middletown, Pa., in this March 17, 2009 file photo. Radioactive tritium, a carcinogen, now taints at least 27 of the nation's 104 nuclear reactors — raising concerns about how it is escaping from the aging nuclear plants. (AP Photo/Carolyn Kaster)

(AP) Radioactive tritium, a carcinogen discovered in potentially dangerous levels in groundwater at the Vermont Yankee nuclear plant, now taints at least 27 of the nation's 104 nuclear reactors — raising concerns about how it is escaping from the aging nuclear plants.

The leaks — many from deteriorating underground pipes — come as the nuclear industry is seeking and obtaining federal license renewals, casting itself as a clean-green alternative to power plants that burn fossil fuels.

Tritium, found in nature in tiny amounts and a product of nuclear fusion, has been linked to cancer if ingested, inhaled or absorbed through the skin in large amounts.

The Nuclear Regulatory Commission said Monday that new tests at a monitoring well on Vermont Yankee's site in Vernon registered 70,500 picocuries per liter, more than three times the federal safety standard of 20,000 picocuries per liter.

That is the highest reading yet at the Vermont Yankee plant, where the original discovery last month drew sharp criticism by Gov. Jim Douglas and others. Officials of the New Orleans-based Entergy Corp., which owns the plant in Vernon in Vermont's southeast corner, have admitted misleading state regulators and lawmakers by saying the plant did not have the kind of underground pipes that could leak tritium into groundwater.

"What has happened at Vermont Yankee is a breach of trust that cannot be tolerated," said Republican Gov. Jim Douglas, who until now has been a strong supporter of the state's lone nuclear plant.

Vermont Yankee has said no tritium has been found in area drinking water supplies or in the Connecticut River and that earlier, lesser tritium levels discovered last month were of no health concern. Messages left for a plant spokesman Monday were not immediately returned.

President Barack Obama, in his State of the Union address last week, called for "building a new generation of safe, clean nuclear power plants in this country." His 2011 budget request to Congress on Monday called for \$54 billion in additional loan guarantees for nuclear power.

The 104 nuclear reactors operating in 31 states provide only 20 percent of the nation's electricity. But they are responsible for 70 percent of the power from non-greenhouse gas producing sources, including wind, solar and hydroelectric dams.

Vermont Yankee is just the latest of dozens of U.S. nuclear plants, many built in the 1960s and '70s, to be found with leaking tritium.

The Braidwood nuclear station in Illinois was found in the 1990s to be leaking millions of gallons of tritium-laced water, some of which contaminated residential water wells. Plant owner Exelon Corp. ended up paying for a new municipal water system.

After Braidwood, the nuclear industry stepped up voluntary checking for tritium in groundwater at plants around the country, testing that revealed the Vermont Yankee problem, plant officials said.

In New Jersey last year, tritium was reported leaking a second time from the Oyster Creek plant in Ocean County, just days after Exelon won NRC approval for a 20-year license extension there. The Pilgrim plant in Plymouth, Mass., like Vermont Yankee, owned by Entergy, reported low levels of tritium on the ground in 2007. The Vermont leak has prompted a Plymouth-area citizens group to demand more test wells at the Massachusetts plant.

NRC spokesman Neil Sheehan says leaks have occurred at least 27 of the nation's 104 commercial reactors at 65 plant sites. He said the list likely does not include every plant where tritium has leaked.

The leaks have several causes; underground pipes corroding and the leaking of spent fuel storage pools are the most common. The source of the leak or leaks at Vermont Yankee has not been found; at Oyster Creek, corroded underground pipes were implicated.

Many radiological health scientists agree with the Environmental Protection Agency that tritium, like other radioactive isotopes, can cause cancer.

That worries Vermont public officials and lawmakers. Rep. Tony Klein, chairman of the Natural Resources and Energy Committee in the Vermont House, said he fears public officials may be downplaying the risk.

"When you have public officials that the public depends on for their health and welfare making casual statements that a radioactive substance is not harmful to you, I think that's ludicrous," Klein said.

There's disagreement on the severity of the risk.

"Somebody would have to be drinking a lot of water and it would have to be really concentrated in there for it to do any harm at all," said Jacqueline Williams, a radiation biologist at the University of Rochester Medical Center in New York state.

But in 2005, the National Academy of Sciences concluded after an exhaustive study that even the tiniest amount of ionizing radiation increases the risk of cancer.

"The scientific research base shows that there is no threshold of exposure below which low levels of ionizing radiation can be demonstrated to be harmless or beneficial," Richard R. Monson, associate dean for professional education and professor of epidemiology at the Harvard School of Public Health, said when the NAS released its study.

Paul Gunter of the Maryland-based anti-nuclear group Beyond Nuclear, said in many instances, it's impossible to know how much tritium is getting into the environment.

"These are uncontrolled, unmonitored releases from these plants," he said.

Steve Kerekes, spokesman for the Nuclear Energy Institute, an industry group, said the public shouldn't be unduly worried.

"These are industrial facilities, and any industrial facility from time to time is going to have equipment problems or challenges," Kerekes said. "Not every operational issue rises to the level of being a safety issue."

Vermont, with a strong anti-nuclear movement, is the only state in the country where the Legislature decides whether to relicense a nuclear plant. Vermont Yankee's current 40-year license is up in 2012, and Entergy is asking for 20 more years.

© MMX The Associated Press. All Rights Reserved. This material may not be published, broadcast, rewritten, or redistributed.

[Add a Comment](#)

Connect with CBS News [Facebook](#) [Twitter](#) [X](#)

Senator SANDERS. Mr. Chairman, has the NRC leveled any fines against Vermont Yankee or any of these other nuclear power plants for these tritium leaks?

Mr. JACZKO. I am not aware that the NRC has leveled fines.

Senator SANDERS. Any punitive action?

Mr. JACZKO. Yes. We have taken review of these actions from an enforcement perspective or as part of our reactor oversight process. So the way we establish our oversight is that when there are violations or there are issues that are not consistent with the license, we have a system of increased inspections that we do to identify and address the issue.

Senator SANDERS. My question was 27 plants are leaking tritium. Have any of these plants been fined? A nickel, a dollar, \$100?

Mr. JACZKO. I am not aware of any fines that we have issued.

Senator SANDERS. Thank you.

Mr. JACZKO. Senator, if I could say that when we changed our oversight process, we took away that aspect of our enforcement program. So for instance in the case of Braidwood, which was one of the first places where we had a really significant issue with tritium, we did take an action and give them a higher level of inspection.

Senator SANDERS. In all due respect, a higher level of inspection. People are leaking a possible cancer causing product, and your response was to do a higher level of inspection. I think most Americans would not be satisfied with that.

Let me go to my second question, which is a broad one. And Mr. Chairman, maybe you could help me here because I don't want to mistake what I think are the facts.

My understanding, and please correct me if I am wrong on this, anybody on the panel or fellow Senators, my understanding is that the U.S. Government spent some \$7.7 billion researching and developing Yucca Mountain. Mr. Chairman, does that sound like a roughly correct fact? Seven point seven billion dollars.

I was in the House when that whole debate took place. And when you spend over \$7 billion of taxpayers' money in order to develop a national repository, the thought is that it is absolutely essential that you have that repository to deal with existing radioactive waste and any future waste that may be developed.

As far as I understand, somebody can correct me if I am wrong, Yucca Mountain is now dead. The people of Nevada don't want it. Their Senators don't want it. It is dead. It is gone.

To the best of my knowledge, I have not heard any other State come forward and say we want existing radioactive waste, not to mention any new waste that might be developed in future plants.

So my question is, if we spent \$7 billion developing Yucca Mountain as a national repository for nuclear waste, if that is not going anywhere, how with a straight face can anybody be talking about building new nuclear power plants where we don't have a national repository to take care of the waste generated by the plants currently in existence?

Mr. Chairman.

Senator CARPER. In responding, let me just say the question, whether it is \$7 billion or some other number, I just would point out I don't believe we are talking about the taxpayers' money. I

think the money is ratepayers' money. Many of them are taxpayers, but there is a distinction there.

Senator SANDERS. OK. Thank you.

Chairman Jaczko.

Mr. JACZKO. The Commission looks at this issue in two ways. One, we look at it from the standpoint of the safety of spent fuel, and can spent fuel be maintained safely and securely. Right now, the Commission believes that spent fuel can be maintained safely and securely for at least 100 years.

Senator SANDERS. Then why did we spend \$7 billion looking at Yucca?

Mr. JACZKO. Certainly from the NRC's perspective, I can't get into specifics of Yucca Mountain and the status of Yucca Mountain.

Senator SANDERS. I don't want you to. All that I am saying, and correct me if I am wrong, obviously there was a belief that we needed a national repository at Yucca or anyplace else. That isn't going to happen.

Mr. JACZKO. I think there is a strong sense, and the Commission has gone on record that the storage of spent fuel can ultimately be done in a geologic repository.

Senator SANDERS. So we wasted \$7 billion by looking at Yucca under the thought that we needed a national repository. Is that what you are suggesting?

Mr. JACZKO. What I am suggesting is that the NRC's focus is on the safety and security of this fuel. And we think fundamentally that can be done for at least 100 years, and right now the agency is looking at what would happen beyond that 100 years until we have an ultimate decision about where this fuel would go, whether it would go through a reprocessing cycle; whether it would be ultimately put in a geologic depository somewhere.

But right now, we believe that the risks and the safety and security of the spent fuel are very, very low, and that it is something that can be maintained safely. It has been maintained safely at reactor sites both in wet storage and in dry storage for decades. So we believe that there is a strong program in place right now to look at the safety of it.

The other piece of it is the environmental impacts, and that is something that we do through a regulation that we have called waste confidence. And that is something that the Commission is looking at revising right now, given just the current state.

Senator SANDERS. Mr. Chairman, thank you.

Does anybody else want to comment? It is an interesting thought. I was in the House. I guess in the Senate that debate took place and \$7 billion spent on what essentially the Chairman is saying didn't happen, not a problem.

Senator VOINOVICH. The bottom line is that money was collected from ratepayers and it is about \$29 billion; \$7.5 billion or whatever has been Yucca Mountain. The rest of it has been used to balance the budget, so there is no money in the trust fund.

Senator SANDERS. But be that as it may.

Senator VOINOVICH. Yes, but the fact is that every year, the Department of Energy is sued by the utilities, and they lose the lawsuits because they promised that they were going to find someplace to put the waste instead of putting it in dry storage.

Senator SANDERS. That is fair enough. My only point, Senator Voinovich, is that we have spent an enormous amount of money under the premise that we needed a national repository. We don't have one. To the best of my knowledge, we are not looking at one. And now people apparently are comfortable about building 100 new nuclear power plants. It doesn't make a lot of sense to me, I have to say frankly.

Do other people want to comment on that on the panel? Am I missing something here?

Thank you very much, Mr. Chairman.

Senator CARPER. You bet.

Let's see, Senator Voinovich, I think you are up.

Senator VOINOVICH. First of all, many of us have legislation we have introduced to create a vehicle where that money would go and not go in the general fund that would deal with used fuel. And Secretary Chu has a Blue Ribbon Committee right now that he has set up that supposedly will report back in 18 months about what the alternatives are in terms of dealing with that situation. He is not for recycling it right now because he thinks it is too expensive, as they do in France, and he is worried about the problem of plutonium. So they are aware of the problem, and they are aware of getting lawsuits.

Second of all, I think it is really important, and I think you should send a news release out. I am not even asking for a comment. I would like to know the harm done by tritium versus living in Denver or taking a flight. I would like to know what it is in relationship to and in terms of human health and problems. I am not going to get into that now.

Senator Sanders raised a question. I have other questions to ask.

Mr. JACZKO. I would just briefly say, Senator, we have a fact sheet that talks about the impacts of tritium, and we can send you a copy of that.

Senator VOINOVICH. OK. I would appreciate it.

The other thing is that you had Dick Meserve then you had Nils Diaz, then you have Chairman Klein and now you. And your organization has gone through systemic change and transformation. It takes a long time for it to happen. In any quality organization, you are going to have continuous improvement, and that is what we expect that this board is going to provide us. I would love someday to have somebody look back and see the improvements made.

But I would like to point out, if you are talking about safety, that we went through some really tough hearings back in 2002 because of what happened at Davis-Besse. As a result, Mr. Chairman, I would like for you to comment about the fines and the things that happened because of the fact that the Commission wasn't doing their job, and the company wasn't doing their job, and what happened to them.

Last but not least, I would like to point out that because of the lessons learned there, that is the real issue, lessons learned, recently there was discovery of some problems that they had at Davis-Besse. They found them out because of the new protocol that you folks have established.

I want people to understand that things do happen to people when they don't do what they are supposed to do, and how you try

to correct the situation. And because you have, we are in a lot better position today than we were, say, back in 2002.

Can you comment on that?

Mr. JACZKO. Senator, you are correct. We have a new oversight program in place. The focus of that oversight is on getting the licensees to improve and correct their behavior. So we have moved away, other than in very specific situations, from using monetary fines as our enforcement mechanism. We rely on orders.

Senator VOINOVICH. Yes, but there were criminal charges filed against people. I think the company was fined millions of dollars, wasn't it?

Mr. JACZKO. That is correct. Like in Davis-Besse, when there is a willful violation of our regulations, we take very severe enforcement action that involves civil penalties and fines. When we are talking about things like inadvertent leaks, if there is not a willful activity on the part of an employee, we deal with that through our oversight process.

The way that oversight process works is it focuses on improving licensee behavior. So we have inspections programs that we use. We require the licensees to have a corrective action program to ensure that they take corrective action and that they take lessons learned. And we monitor all of these performance indicators that tell us how the plant is performing.

If we see negative information from those indicators, then we take more and more aggressive action in our oversight, to the point where we would shut them down if we needed to.

Senator VOINOVICH. OK. The other thing is that a lot of people are not aware that the industry itself is doing a lot more policing. I don't know what the organization is called, but I have talked to some of the people that run these places and say they are really tough on them. In other words, the industry itself understands that they have to put peer pressure on other members because they realize that if something goes wrong, it is not only going to impact on that individual, but it is going to also impact on the entire industry.

Mr. JACZKO. The organization is INPO, the Institute for Nuclear Power Operations that you are referring to. They perform an industry self-regulatory function, and we do communicate with them to compare how they see performance of licensees as well as how we do.

I think one very telling statistic, I think as Commissioner Apostolakis mentioned, are efforts to put in place a new process for the fuel cycle oversight program. The reactor oversight program that we implemented about 10 years ago has really helped us focus on the real safety significant issues. When that program first started, we began a process of having annual meetings where we would have power reactors come in who were not performing well, to talk about their performance.

I think because of this enhanced and improved oversight process, this year will be the first year that we don't have a plant that has significant enough safety problems to warrant coming to that meeting. So I think it is really a reflection on the fact that we are focusing on the issues that matter from a safety and a security standpoint.

The issues like tritium I think are significant issues from a public confidence standpoint, but right now we don't see that they are having an impact on the safe operations of the facilities, and we don't see them having immediate impact on public health and safety.

They are very significant issues, and I think the agency takes them very seriously, and we have done a tremendous amount of outreach to talk about these things and to talk about the issues because they are of concern to the communities. I think it is very important for us to make sure that we are able to communicate and address those issues. So that is the approach we have taken.

Senator VOINOVICH. The other thing is in terms of what I talked about in my statement regarding the SMRs. I think it is significant that the Secretary of the Department of Energy, Dr. Chu, had an article in the Wall Street Journal entitled America's New Nuclear Option. He talked about the fact that their small size makes them suitable for locations that cannot accommodate large scale plants. The modular construction process would make them more affordable. Their modular nature allows utilities to add units as demand changes or use them for onsite replacement of aging fossil fuel plants. And last but not least, some of the designs for SMRs use little or no water for cooling, which would reduce their environmental impact.

And I know you are starting to look at this issue of SMRs, but could you comment on where you think you are with that and when you would be prepared to handle any applications that would come in to deal with them?

Mr. JACZKO. I think I would break that group of small modular reactors into three categories. The first category, I would say, are what we call the integral light water reactors. Those are small modular reactors that use the more traditional technologies to what we are using today in the nuclear reactor fleet.

We are preparing to review two design certifications sometime in mid-2012 to 2013 for those smaller light water reactors.

Senator VOINOVICH. In other words, it is going to take that long for all that process to go through?

Mr. JACZKO. That is when we are anticipating that the applicants would be ready to submit an application. So we are basing that off of their schedules and when they anticipate submitting those. And that is working in conjunction with the Department of Energy program to help provide some financial assistance to those particular vendors. They intend to fund two different vendors for design certification.

The second piece is the gas reactor technology that I think Commissioner Apostolakis may have referred to, the so-called next generation nuclear plant. And we are on process to receive a design review for that in 2013. So that would be on a separate track as well, because it is a slightly different technology.

The third piece of that—and probably the least certain right now and the one that is most far into the future—would be small modular reactors that rely on non-light water or gas reactor technology, things like sodium cooled reactors and other more exotic types of reactors. That program is probably the least well developed at this

point, and I wouldn't anticipate the agency being really ready to deal with that in the near term.

But we also don't see any real immediate commercial interest in those particular applications, so I think focusing our efforts on the light water reactors and the gas reactors, because that is a statutory program, is really the best place to put our focus. But I think we are prepared to deal with at least a portion of the applications that would be coming forward.

Senator VOINOVICH. The last thing, I am out of time, but could somebody give me a survey of what is happening internationally in this regard? You have it there. If you don't have it, I will try to get it from the Department of Energy.

Mr. JACZKO. We can certainly look to see what we have. If we don't have anything, we will let you know and see if we can point you to a place that can provide that for you.

Senator VOINOVICH. Thank you.

Thank you, Mr. Chairman.

Senator CARPER. Thank you, Senator Voinovich.

Senator Alexander.

Senator ALEXANDER. Thanks, Mr. Chairman.

Mr. Jaczko, has there ever been a fatality as a result of an accident at a commercial nuclear reactor in the United States?

Mr. JACZKO. There has not as a result of plant operation, not at a commercial power plant. There have been other nuclear facilities where there have been fatalities, but not in a nuclear power plant.

Senator ALEXANDER. Not as a result of the reactor.

Mr. JACZKO. Not as a result of a reactor accident.

Senator ALEXANDER. Mr. Ostendorff, has there been a fatality as the result of the operation of the Navy nuclear reactors in the history of the Navy program?

Mr. OSTENDORFF. No, Senator.

Senator ALEXANDER. Mr. Jaczko, is it approximately correct that the amount of used nuclear fuel that we have stored onsite at the 104 commercial reactors, if we put it all together would it about cover a football field and be 10 or 20 feet deep? Is that about the volume we are talking about?

Mr. JACZKO. I have heard estimates to that effect. It is several tens of thousands of metric tons.

Senator ALEXANDER. But to give a picture of that, would it be about the size of a football field to a depth of 10 or 20 feet?

Mr. JACZKO. I believe that is approximate.

Senator ALEXANDER. The volume isn't very high. And you said it could be stored safely onsite for 100 years.

Mr. JACZKO. Currently, we believe at least to 100 years it can be stored safely onsite, and with very little risk to the public or to the environment.

Senator ALEXANDER. Mr. Apostolakis, what is tritium? What is it? We have been talking about it. What is this tritium we are talking about?

Mr. APOSTOLAKIS. It is an isotope of hydrogen. Is that the answer you want?

Senator ALEXANDER. Well, we are talking about it as a scary substance. Is it harmful?

Mr. APOSTOLAKIS. Well, it could be.

Senator ALEXANDER. What would it take? Let me put it this way. The Senator said that there has been release of tritium in 27 plants. Has it been released in any amount that would be harmful to humans or create environmental damage?

Mr. APOSTOLAKIS. As far as I know, the amount released would not be harmful, but I really don't know the details.

Senator ALEXANDER. Mr. Jaczko, do you know?

Mr. JACZKO. At this point, we have not seen any releases off the reactor sites that are above Environmental Protection Agency limits for what are safe levels of tritium, which right now I think it is 20,000 picocuries per liter.

Senator ALEXANDER. So the information we have heard about so far, it doesn't harm anybody.

Mr. JACZKO. We have no information yet that there have been any consequences to public health and safety for this. There is, I think it is fair to say, I would look at it from perhaps a good neighbor policy in a way that this is not the way the NRC would like to see these reactors operate.

Senator ALEXANDER. No, no. No one is suggesting that.

Mr. JACZKO. It is certainly not the best behavior to have these kinds of leaks and to have these kinds of occurrences happen.

Senator ALEXANDER. But if you have \$100 and you lose \$1, that is a problem. You don't want it to happen, but it is not necessarily harmful to you. It is not necessarily dangerous.

Let me, if I may, go on. The Senator from Vermont and I have some agreement as well as some differences of opinion on energy. One agreement we have is on energy efficiency. We absolutely agree on that.

A second agreement we have is our hope for the success of solar power, making it cheaper because it operates at peak time. But just for the record, Secretary Chu, the Nobel Prize-winning physicist who is President Obama's Energy Secretary, says it is still too expensive by a factor of four compared to other forms of energy. That is his judgment, and we hope that it will get better because we make a lot of the polysilicon in Tennessee, so that would mean more jobs for Tennessee if that happens.

As far as wind goes, I would have to observe that if we closed the Yankee Nuclear plant in Vermont, it would take about 1,800 50-story wind turbines all over the scenic hillsides of Vermont. It would cover every scenic ridge up there, I think, to replace that. So there are some costs that come from other things.

I would like to go back to this. What could the oil industry learn from the Nuclear Regulatory Commission? Oil drilling is regulated by about 14 agencies, not a single entity like nuclear power.

And I wonder, Mr. Ostendorff, you, from your Navy experience, and Mr. Jaczko, you as Chairman, are there any lessons from the Navy's safe operation of nuclear reactors and America's safe operation of nuclear commercial reactors that other forms of energy might learn from those operations?

Mr. OSTENDORFF. Senator, I would suggest the concept of accountability, where accountability is clear and understood by all parties involved. Our responsibilities here at the Nuclear Regulatory Commission involve the safe operation of the country's reactor plants, but we hold the licensees responsible. And so it is clear

those licensees are accountable to the Government via this body of individuals and staff that work with us.

Senator ALEXANDER. My impression, not to interrupt, but if you are a commander of a Navy vessel, and there is a single problem with a nuclear reactor, that is not somebody else's fault. Correct? It is your fault.

Mr. OSTENDORFF. That is correct. Just as an anecdote, when I went through my commanding officer training in 1992, there were 11 people in the class, and 4 of those 11 very fine individuals at some time or another had some time of disciplinary action taken against them because of something that happened during their time as commanding officer of a submarine. And so that accountability practice and series of principles are very much real in that environment.

Senator ALEXANDER. Mr. Jaczko, just quickly, as you look at what is happening in the Gulf, is there anything you would think that regulating the drilling of oil could learn from the experience we have had with nuclear commercial reactors?

Mr. JACZKO. I think there are several things. One I think is this idea of having an oversight program that is focused on the safety significant issues, and really making sure that you don't get distracted with minor violations, but really focus on the things that matter from a safety perspective.

The other thing that I think is very important piece is the idea of safety culture. That is really a developing aspect of the nuclear power industry, and it is really I think an area in which are continuing to lead in the ideas of safety regulation.

I would mention that there was a very significant incident at an oil refinery in the southern United States. I don't remember exactly which State now, but I believe it was Texas. A study was led about that oil refinery accident. It was a significant accident. People died, I believe. One of the things that came out of that was a significant recognition that this concept of safety culture was extremely important and was lacking in these kinds of industries.

So it is an area where we are focusing in the nuclear side, and I think it is an area where other safety sensitive industries could really be enhanced by a focus on that area.

Senator ALEXANDER. Thank you, Mr. Chairman.

Mr. APOSTOLAKIS. Could I say something, Senator?

Senator ALEXANDER. Yes.

Mr. APOSTOLAKIS. I think the most important principle that we have implemented in the nuclear business that I think other industries can benefit from is the concept of defense in depth, which says basically and asks us all the time to ask the question: What if we are wrong? We have these multiple defenses against the release of radioactivity and every single time we are saying, well, gee, everything is good, but what if we are wrong? Maybe we should do something about it.

A good example is the emergency evacuation plans. We know that the probability of a catastrophic accident is very, very low, and yet we demand there be evacuation plans.

Judging from what I read in the media, I think the oil industry and other industries of this kind could benefit from that philosophy

of defense in depth. What if something happens? How are we going to respond? And be ready for it.

Senator ALEXANDER. Thank you.

Mr. Chairman, I wonder if I might just ask this question which might get a yes or a no.

Senator CARPER. As long as it gets a yes or a no.

Senator ALEXANDER. To the Chairman, if the goal of the Department of Energy program for small reactors is to have two design certifications completed by 2015 and licensed by 2018, is the Department dedicating enough money to permit you to do your job with everything else that you have to do?

Mr. JACZKO. In my discussions with the Department of Energy, I think they are providing what I would say they believe is a right level of funding. I think the most important indicator will be in the technical quality, in the technical completeness of the application. For us to review it in a relatively straightforward manner, it needs to come in at a very high quality with a very high degree of completeness.

So as I became aware of the Department of Energy program, it was clear that they were putting resources to support those vendors in a way that would work toward getting that high quality application.

I can't speak for sure to say whether it is enough or not. I would probably defer that question to the Department of Energy.

Senator ALEXANDER. That didn't sound like a yes.

[Laughter.]

Senator ALEXANDER. But thank you very much.

Mr. JACZKO. I would prefer not to speak for the Secretary of Energy on those matters.

Senator CARPER. All right. Fair enough.

We will have a second around. We used about 8 minutes on our first round, and then I will ask that we use about no more than 4 minutes on our second round. We need to get a second panel up here, so they will have their moment in the sun.

For currently operating plants, what are you doing to look at NRC performance indicators for plant oversight and to revise them over time? Could you also describe for us how the NRC cooperates with or how you share data with the Institute for Nuclear Power Operations? We understand the NRC and the Institute use different standards to measure safety performance.

Mr. JACZKO. Every year, the agency does a self-assessment of our reactor oversight program. And every year, that includes a look at those indicators that we have to measure licensee performance. In the last year specifically, the staff went out and met with members of the industry, with INPO, the Institute of Nuclear Power Operations, to look at performance indicators that they use that we currently don't use.

So they are continuing that dialogue to see if there are other indicators that we could perhaps use in place of the ones that we are currently using to ensure that we are continuing to find the right kind of information and measuring the right performance or actually measuring the performance.

With regard to the information with the Institute of Nuclear Power Operations, we have a memorandum of agreement to share

information with them about their assessments of plant performance compared to our assessment. Our staff does meet with them at least on an annual basis to review those kinds of assessments, and we have other more informal dialogues certainly throughout the year.

As a measure, in many ways a second look at how we view performance, what I often hear from the staff is that they find the plants that are the most interesting from the perspective of our attention are those plants in which we have a slightly different view of the licensee performance than INPO does. Often, we may learn some things from them about performance that we weren't necessarily looking at as part of our process because they do have a slightly different review, given their focus is also a little bit more on management than we focus on.

Senator CARPER. All right.

I welcome comments from anyone else on the panel.

Dr. Apostolakis, did you want to say something?

Mr. APOSTOLAKIS. I think the oversight process is one of the most successful processes that has been proposed by the Commission. It is being improved all the time, but I got some crazy ideas as we were discussing earlier the tritium issue that maybe we ought to include something, and again, this is completely personal now, as I have not even talked to my colleagues about it, to add to the process something that deals with events that undermine public confidence, that are not safety significant. They are not threatening the health of anybody, but it might be a good idea to at least think about it because the oversight process I think works very well now to protect the public health and safety.

Senator CARPER. All right. Thank you.

Senator Alexander, do you have any last questions you want to ask?

Senator ALEXANDER. I have a couple. I don't mind if Senator Sanders wants to go ahead. I can wait on him if he likes.

Senator CARPER. All right.

Senator Sanders, go ahead.

Senator SANDERS. I will be brief. Thank you, Senator Alexander.

Senator Alexander and I do agree on a number of issues, solar and energy efficiency. And I don't want to beat a dead horse. I am not a biologist here, but picking up on Senator Alexander's point and implication that tritium is not dangerous. The truth is, let me quote from an article, the AP article: "Many radiological health scientists agree with the EPA that tritium, like other radioactive isotopes, can cause cancer."

And the article further says there is disagreement about the risk. "Somebody would have to be drinking a lot of water, and it would have to be really concentrated in there for it to do any harm at all," said Jacqueline Williams, a radiation biologist at the University of Rochester. But in 2005 the National Academy of Sciences concluded after an exhaustive study that even the tiniest amount of ionizing radiation increases the risk of cancer.

So we don't want to be fear mongers here, but I think this stuff is probably not something you would sprinkle on your dinner tonight. And I think, as Mr. Apostolakis indicated, we have to err in a sense in terms of public confidence on the side of caution.

I would just conclude, first of all, by expressing my respect to all of you. I think you are serious people. You understand the enormity of the responsibility that you have. But in light of—I guess the only point that I want to conclude, is that in light of what we are seeing now in Louisiana, I have the feeling that at some time, some place, Mr. Chairman, a group of people like you stood before some House or Senate Committee and when asked question about the potential danger of offshore drilling made it clear that there was no danger whatsoever; that the latest technology is there, and rest assured, there is no problem. I suspect that hearing took place at some time, and right now we are dealing with this horrendous catastrophe in the Gulf Coast.

So you are dealing with a potentially very dangerous technology. People are concerned about it. Some of us believe that the risk is just not worth it. There are other ways to solve the energy needs in this country, energy efficiency being one; sustainable energy being the other.

But having said that, I know that you are serious people, that you take your job of protecting the American people with the utmost sincerity, so I thank you for what you are doing.

Thank you, Mr. Chairman.

Senator CARPER. Thank you, Senator Sanders.

Senator Alexander.

Senator ALEXANDER. Thanks, Mr. Chairman.

I wonder if I could ask the Chairman, I really am grateful for this hearing. How many of these do you think we should have? I mean, how regularly do you think we should invite the Commissioners here for a couple of hours and do our oversight job? Sometimes I think oversight in Congress is the authority and constitutional responsibility we have that we exercise the least. What are your plans?

Senator CARPER. It is a good question and one that actually we should discuss further. For our friends, Senator Alexander described hearings. He says they really are misnamed. They should be called talkings, because at most of the hearings, the people on this side of the dais do most of the talking.

This has not been that way in this case. But he has encouraged me, as has Senator Voinovich, to have a different kind of approach, not an official hearing, but the idea of doing something, either a hearing or a less formal process even more frequently than an annual basis.

Senator ALEXANDER. I would like to suggest that, and to tie that to the suggestion from Mr. Apostolakis and Senator Sanders' point about tritium. I think it is important that we have a regular and an open discussion about such things as tritium so that we, Senators, understand it. We shouldn't have a hearing about it until somebody explains to us what it is and compares it to some other things. So we should know what we are talking about. Too often, we get into these things and we act like we know what it is, but none of us, if pressed, could define it.

And the suggestion that maybe a function of the NRC should be to take these exotic concepts and help us understand the risks and help the public understand that. The fact was, as I mentioned at the beginning of the hearing, Three Mile Island was a partial melt-

down of a reactor where the containment system worked, and nobody was hurt. And so far as I know, there was no environmental damage. Yet that was the catalyst, along with other factors, for causing several States to pass laws saying you can't build a nuclear plant here, and causing the country for 30 years to put nuclear plants in mothballs, which is the energy equivalent of going to war in sailboats.

So I think the idea of having more regular oversight by this Subcommittee would be helpful, and I think the Nuclear Regulatory Commission, and I have great confidence in its membership. I applaud the President for the quality of his appointments here and for the Commission that is looking at used nuclear fuel.

Such items as how much used nuclear fuel do we have, if it all fits in one football field that is 10 feet deep, I think it is important for the country to know that. If it is safe for 100 years to be stored at the 100 sites that we now have, I think it is important for the country to know that. If releases of tritium at 27 plants are dangerous, we should know that. If they are not in dangerous amounts, we should know that.

So I think a little more attention to that would be helpful.

Mr. JACZKO. Senator, if I could just comment specifically on the tritium, I think that is a very good suggestion. One of the things that we have done with this issue is a more aggressive outreach program. We had a meeting in Vermont just to talk specifically about the tritium issue, to hear from your constituents, Senator, but to hear from the people in the community about what their concerns are.

We followed that up with a meeting in Washington to do exactly what you said, which is to talk about tritium, to talk about what it is so that people understand, and we can do a better job of helping them understand what it is and how we address it and deal with it.

Senator ALEXANDER. Yes, but even to be more specific, if I may, Mr. Jaczko, I mean soft drinks can be dangerous if you swim in it. I mean, if it is not being released in harmful amounts and if that is the opinion of scientists at the Nuclear Regulatory Commission, someone should say that. If it is, we need to know that. Either way.

Mr. OSTENDORFF. Senator, may I comment on that please?

Just to follow up on the Chairman's comments, I recognize and Senator Sanders has raised the public confidence issue, which is a critical issue. And I think we are completely in agreement, Senator, that the public confidence piece is extraordinarily important and that right now in Vermont many people do not have that confidence. We appreciate that reality.

The education piece, and I am going to just maybe give you a couple of numbers to put this in perspective based on my understanding, and I will ask my colleagues to correct me if I am wrong, the average American citizen receives background radiation, radiation from dental x-rays, CAT scans, et cetera, that amount to about 200 to 300 millirem per year. The Federal occupational dose limit is 5,000 millirem per year or 5 rem.

The tritium piece that was referred to earlier, the limit in drinking water is 20,000 picocuries per liter. That is the drinking water limit. The picocurie, that is one times 10 to the minus 12 is the

mathematical piece. If I were to drink water every day over the course of 1 year of 20,000 picocuries per liter of concentration, then I would receive 4 millirem per year radiation exposure. Since 4 millirem per year exposure for drinking water at the limit that we are talking about, in context of an overall background of about 200 to 300 millirem per year. So about one-fiftieth to one-sixtieth of your annual average radiation dose would result from drinking that level of water.

So far to date, none of the drinking water samples taken at any of the plants have had any contamination in excess of the 20,000 picocuries per liter.

Senator ALEXANDER. Thank you, Mr. Chairman.

Senator CARPER. With that, I am going to have a drink.

[Laughter.]

Senator CARPER. And I will conclude. We appreciate very much each of you being here. We appreciate your preparation. As you leave, I want you to take with you this thought. As Commissioners, you lead the agency in charge of nuclear safety that is most admired throughout the world, of all the nations, as an agency. The people that you lead have helped us preside over the improvement in operating efficiency of nuclear power plants in this country, from maybe less than 70 percent to today as high as 90 percent or greater.

And the folks who work at the Nuclear Regulatory Commission have been recognized, and the agency has been recognized year after year as the best place to work in Federal Government. Those are very high standards to maintain, but we are going to ask you to do more than just to maintain because we know if it isn't perfect, make it better. We know it is not perfect. Nothing that I do is perfect. And as good as the NRC is doing, we know that it is not perfect either. And thus we would ask you to continue to strive for perfection.

And the other thing I would say, as I am sure Captain Ostendorff and I recall from our time in the Navy, there are times when whether it is a submarine or a fleet of submarines or aircraft or ships, when you find out that a procedure that is being followed on a submarine or ship or aircraft is unsafe or unwise. And the idea is not just to internally digest that, but frankly to share that with others so that other ships, submarines or aircraft carriers, if you are doing something that is wrong or foolish or stupid, the others can correct that. And when somebody steps forward and really makes the admission that, hey, we are doing this, and this isn't good, or this particular piece of equipment there is something wrong here, it needs to be shared.

So while on the one hand we want to respond to inappropriate behaviors. On the other hand, we want to do so in a way that does not convince the agency or convince the industry to hide things, to keep secrets that actually will lead to problems further down the road.

So you have a proud legacy to uphold, but you still have your hands full. A lot is riding on this, and we are counting on you to continue to do a great job.

Our colleagues have about 2 weeks that they can ask additional questions. If you receive any additional questions, we would just ask that you respond to them promptly.

Thank you so much.

And now we will welcome the second panel.

Gentlemen, I am going to ask you to go ahead and take your seats with the right name tag in front of you. Good to see you all. Thank you for our patience. I am going to take a moment to just briefly introduce our witnesses.

On this panel we have a couple of you who are no strangers here. You have been before this Subcommittee any number of times and we welcome you back.

First, we have Hon. Richard Meserve, President of Carnegie Institute for Science, and with us today on behalf of the Bipartisan Policy Center, which was established by a number of our former colleagues and does good work.

Dr. Meserve is a former NRC Chairman. As many of you know, he currently serves on the Blue Ribbon Commission on America's Nuclear Future established by Department of Energy Secretary Chu, as referenced earlier today. He also currently serves as Chairman of the International Nuclear Safety Group, which is chartered by the International Atomic Energy Agency, and is a member of the National Commission on Energy Policy. You are pretty busy. It is good to see you.

Next we have Mr. George Vanderheyden, President and Chief Executive Officer of UniStar Nuclear Energy, a Constellation Energy and EDF Company. Mr. Vanderheyden leads the company's efforts to develop and deploy the first new generation of nuclear energy facility in North America. Mr. Vanderheyden also serves as Senior Vice President of Constellation Energy's Nuclear Group, overseeing Constellation's new nuclear interests, president of UniStar, LLC, a project to market evolutionary power reactor technology adapted specifically to the United States.

Next, Hon. Peter Bradford. Again, we appreciate you being with us previously. But Mr. Bradford was an NRC Commissioner during the Three Mile Island accident and today is an Adjunct Professor at the Institute for Energy and Environment at the Vermont Law School. He is also a former Chair of the New York and Maine Utility Commissions, and has advised many States on utility restructuring issues. He has also served on the board of the Union of Concerned Scientists. We welcome you back to the Subcommittee, Mr. Bradford. Nice to see you again.

And finally, we have Dr. Singh, President and CEO of Holtec International, an energy technology manufacturing company that he established I believe 24 years ago, 1986. His company designs equipment and systems that improve the safety and reliability of nuclear and fossil fuel power plants. Dr. Singh serves on several corporate boards, including the Nuclear Energy Institute and the Board of Overseers at the University of Pennsylvania's School of Engineering and Applied Sciences, just up the road from Wilmington, Delaware.

Again, we want to ask you to try to limit your statements to about 5 minutes, and the full content of your written statements will be included in the record.

Welcome and all, and Mr. Meserve, why don't you kick us off?
Thank you.

**STATEMENT OF RICHARD MESERVE, PRESIDENT, CARNEGIE
INSTITUTION FOR SCIENCE; FORMER COMMISSIONER, U.S.
NUCLEAR REGULATORY COMMISSION**

Mr. MESERVE. Good morning, Mr. Chairman. I am very pleased to appear before you on behalf of the Bipartisan Policy Center. I am here to discuss the Nuclear Regulatory Commission's licensing process for new reactors.

The Bipartisan Policy Center was created to help forge bipartisan consensus across a range of difficult policy challenges. Last fall, the NRC Chairman asked the Center to conduct an independent review of the progress that has been made in licensing new nuclear power plants. Together with former Senator Pete Domenici, who is currently a Senior Fellow at the Center, I co-chaired this effort. I very much enjoyed working with your former colleague.

We began by conducting a series of confidential interviews. The group included former NRC Commissioners, representatives of reactor vendors, applicants for combined operating licenses, nuclear engineering firms, and representatives of environmental and other organizations. We also met with NRC staff.

We then hosted a half-day forum to elicit additional views and comments. A copy of our letter report is attached to my testimony.

I would like to highlight here in this oral testimony just a few of our key findings. Although the licensing process is new, we found that both the NRC and the industry have been diligent in pursuing the timely evaluation of license applications. The parties have experienced some problems. Nonetheless, there was a near unanimous view among the stakeholders that all parties had acted appropriately and in good faith, and the NRC has not needlessly delayed or extended the licensing process.

The licensing process for new reactors that is now underway has been a learning experience for all involved. The licensing system embodied in Part 52 of the NRC's regulations had envisioned that applications for combined operating licenses would reference designs that had been certified and sites that had the benefit of an early site permit.

As it happened, numerous applications for combined operating licenses were filed in parallel with applications for certified designs. The staff thus had the challenge of dealing simultaneously with a large number of overlapping applications. This was further complicated by the fact that new plant licensing has been dormant for many years and needed to be resuscitated. Overall, we believe that the NRC staff has done a remarkable job under trying circumstances.

It was also clear from our interviews that there has on occasion been some miscommunication between the NRC staff and applicants, leading to some confusion and delay. Much of the confusion can apparently be traced to misunderstandings as to NRC expectations in regard to the level of detail required or expected in applications. In our judgment, many of these issues should resolve themselves as all sides gain more experience.

The Commission and NRC staff should also strive to provide clear guidance to applicants. The Commission can and should continue to exercise clear leadership to ensure that the processing of the application continues with the same attention to detail and to efficiency as has been the case to date. The Commission should ensure that the lessons learned in the first round of applications are rigorously applied to make the processing of subsequent applications more efficient.

The study revealed that both the NRC and the industry are genuinely respectful of each other's efforts. With clear leadership by the NRC, the lessons learned in the first round of applications should ensure that the processing of subsequent applications is both thorough and efficient.

Thank you for the opportunity to testify. I am very happy to respond to questions.

[The prepared statement of Mr. Meserve follows:]

Statement of Dr. Richard Meserve
On behalf of the Bipartisan Policy Center
Before the Subcommittee on Clean Air and Nuclear Safety,
Committee on Environment and Public Works
United States Senate
May 5, 2010

Good morning. I am pleased to appear before you this morning on behalf of the Bipartisan Policy Center to discuss the current state of the Nuclear Regulatory Commission's licensing process for new nuclear reactors.

The Bipartisan Policy Center (BPC) was founded by four former Senate majority leaders -- Tom Daschle, Bob Dole, Howard Baker and George Mitchell. It was created to help forge bipartisan consensus across a range of difficult policy challenges. The BPC's model of principled, bipartisan compromise was pioneered by its first project, the National Commission on Energy Policy (NCEP). I am speaking to you today on behalf of the BPC, but I also serve as a member of NCEP. In addition to NCEP, the BPC also has ongoing projects that address a broad array of other issues, including national security, homeland security, transportation, health care, financial services/national debt, and science.

Last fall, the Chairman of the Nuclear Regulatory Commission, Gregory B. Jaczko, asked the Bipartisan Policy Center to conduct an independent review of the progress that has been made in licensing new nuclear power plants. Together with Former Senator Pete Domenici, who is currently a Senior Fellow at the BPC, I co-chaired this effort. Our aim was to review the current pace of regulatory proceedings and to make recommendations for improving the existing licensing process going forward. In short, we did not find any evidence that either the NRC or industry has needlessly delayed or extended the licensing process. However, we did make a series of detailed recommendations for ways in which the process could be modestly improved for the next tranche of applications and those beyond.

Our review was designed to gather candid, forthright assessments from a representative cross-section of key stakeholders. We began by conducting a series of confidential interviews with a variety of individuals who are now or have been in the past actively engaged in the licensing process. The group included former NRC commissioners, representatives of reactor vendors, applicants for Combined Operating Licenses (COLs), nuclear engineering firms, and

representatives of environmental and other organizations. We also met with staff from the NRC's Office of New Reactors and with the NRC's General Counsel to obtain their perspectives on the implementation of the licensing process. We held 16 individual meetings.

Once we had completed the individual interviews, we hosted a half-day forum to discuss and debate common themes and issues that had been raised during the individual interviews (without attribution) and to elicit additional views and comments. In addition to the individuals we had already interviewed, we invited all of the current applicants for Combined Operating Licenses, representatives of all reactor vendors, and representatives of various intervenor organizations. Approximately 30 participants engaged in an open discussion of a range of issues pertaining to industry interactions with the NRC, the Design Certification progress, and opportunities to improve the processing of Combined Operating License applications.

We completed our review and personally submitted our final letter report to Chairman Jaczko on April 6th. We also had the opportunity to meet with Commissioners Magwood, Ostendorff, and Svinicki that day to present our findings. (Commissioner Apostolakis had not yet been sworn in.) A copy of our letter report is attached to this testimony.

Key Findings

I would like to highlight a few key findings of our review:

- Although the licensing process is new, we found that both the NRC and the industry have been diligent in pursuing the thorough and timely evaluation of license applications. The fact that all parties have experienced some problems in navigating the process was to be expected under the circumstances: the process is new and all the participants lack experience in licensing new reactors. But all those involved have been diligent in working through the issues in a forthright manner. There was a near-unanimous view among the stakeholders that all parties have acted appropriately and in good faith to resolve any problems, and that the NRC has not needlessly delayed or extended the licensing process. Based on our interviews, we believe that the difficulty of obtaining financing is a bigger obstacle to near-term nuclear plant construction than licensing issues.
- The licensing process for new reactors that is now underway has been a learning experience for all involved. Indeed, the NRC has confronted an unprecedented challenge in processing the initial applications. The licensing system embodied in Part 52 of the NRC's regulations had envisioned that applications for COLs would reference designs that had been certified and sites that had the benefit of early site permits. It was anticipated that, with these pieces in place, the review process for COLs would be relatively straightforward. As it happened, numerous COL applications were filed in parallel with applications for certified designs. The staff thus had the challenge of dealing

simultaneously with a large number of overlapping applications that were filed pursuant to an entirely new and largely untested licensing regime. This was further complicated by the fact that new-plant licensing at the NRC has been dormant for many years and needed to be resuscitated. Overall, we believe that the NRC staff has done a remarkable job under trying circumstances. Many stakeholders expect that the lessons learned in the processing of the initial applications will result in changes that will improve the process and make it more transparent and efficient.

- It was also clear from our interviews that there has on occasion been some miscommunication between NRC staff and applicants, leading to some confusion and delay. Much of the confusion can apparently be traced to misunderstandings as to NRC expectations in regard to the level of detail required in applications. Since the licensing process is new, successful templates by which an applicant can measure its filings do not yet exist. This has put the applicants (and interveners) in a difficult position when applications had to be supplemented as the process has moved forward. Some industry representatives acknowledged that they have not always been able to respond to NRC staff's Requests for Additional Information (RAIs) in as timely a manner as they would like -- the responses can on occasion require significant time and effort -- and they also accept some responsibility for past miscommunications. In our judgment, many of these issues should resolve themselves as all sides gain more experience. The Commission and NRC staff should also strive to provide clear guidance to applicants to minimize delays.
- The Commission can, and should, continue to exercise clear leadership to ensure that the processing of the applications continues with the same attention to detail and to efficiency as has been the case to date. The Commission should ensure that the lessons learned in the first round of applications are rigorously applied to make the processing of subsequent applications more efficient.

Conclusion

The interviews that Senator Domenici and I held revealed that both the NRC and industry generally concur that while they have encountered some bumps in the road, they are genuinely respectful of each other's efforts. With clear leadership by the NRC, the lessons learned in the first round of applications can ensure that the processing of subsequent applications is even more efficient.

The Bipartisan Policy Center welcomes further opportunities to work with and support the Senate Committee on Environment and Public Works. Thank you very much for the opportunity to testify today. I am happy to answer any questions.



BIPARTISAN POLICY CENTER

April 6, 2010

Gregory B. Jaczko
Chairman
Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Dear Chairman Jaczko:

We are writing in response to your request that the Bipartisan Policy Center conduct a review of the NRC licensing process for new reactors. You asked that we examine whether there have been unnecessary delays in the licensing process for new nuclear plants caused either by the NRC or by the nuclear industry. In short, we did not find any evidence that either the NRC or industry has needlessly delayed or extended the licensing process. You also asked for a report on any findings and recommendations to improve the process going forward. This letter constitutes our response to your request.

To accomplish this task, we interviewed NRC staff and former NRC commissioners, representatives of reactor vendors, applicants for Combined Operating Licenses (COLs), nuclear engineering firms, and representatives of environmental and other organizations that have actively engaged in the licensing process. We also hosted a half-day forum to which we invited a broad group of stakeholders to discuss issues raised during the individual interviews and to elicit additional views and comments.

General Themes/Issues

In summary, we found that, while many of the stakeholders have encountered some problems in maneuvering through the licensing process, there was a near-unanimous view that all parties have acted appropriately and in good faith to resolve any problems. The NRC was not seen to have needlessly delayed or extended the licensing process. Based on our interviews, we believe that the difficulty of obtaining financing is a bigger obstacle to nuclear plant construction at the moment than licensing issues.

Nonetheless, a number of suggestions were made for improving the process going forward that we found to be well grounded and reasonable so we mention them in this report. In particular, the parties hope and expect that the lessons learned in the processing of the initial applications will result in changes that will improve the process and make it more transparent and efficient. Given the NRC's performance to date, we expect that this will be the case.

The licensing process for new reactors that is now underway has been a learning experience for all involved. Indeed, the NRC has confronted an unprecedented challenge

in processing the initial applications. The licensing system embodied in Part 52 of the NRC's regulations had envisioned that applications for COLs would reference designs that had been certified and sites that had the benefit of early site permits. It was anticipated that, with these pieces in place, the review process for COLs would be simplified and relatively straightforward. As it happened, numerous COL applications were filed in parallel with applications for certified designs. The staff thus had the challenge of dealing simultaneously with a large number of overlapping applications that were filed pursuant to an entirely new and largely untested licensing regime. This was further complicated by the fact that new-plant licensing at the NRC has been dormant for many years and needed to be resuscitated. And, at the same time, the NRC was undertaking the hiring and training of a large cadre of new employees and managers, while industry was simultaneously rebuilding its staff. Overall, we believe that the NRC staff has done a remarkable job under trying circumstances. Many stakeholders commented on the high level of commitment demonstrated by the NRC staff to resolve disputes in a fair, consistent, and clear manner.

It was also clear from our interviews, however, that there has on occasion been some miscommunication between NRC staff and applicants, leading to some confusion and delay. Much of the confusion can apparently be traced to misunderstandings as to NRC expectations in regard to the level of detail required in applications. Since the licensing process is new, successful templates by which an applicant can measure its filings do not yet exist. This has put the applicants (and interveners) in a difficult position when applications had to be supplemented as the process has moved forward. Some industry representatives acknowledged that they have not always been able to respond to NRC staff's Requests for Additional Information (RAIs) in as timely a manner as they would like -- the responses can on occasion require significant time and effort -- and they also accept some responsibility for past miscommunications. In our judgment, many of these issues should resolve themselves as all sides gain more experience. The Commission and NRC staff should also strive to provide clear guidance to applicants to minimize delays caused by miscommunications as subsequent applications make their way through the process.

Design Certification

The current Design Certification (DC) process has proven cumbersome, in large part because of the parallel submission of COL applications referencing a design then undergoing review for certification. As noted above, efficiencies would have been available if the design certifications had been completed before the NRC was required to process the COL applications referencing that design. The simultaneous processing of DC and COL applications has created some uncertainty arising from the interplay between the two processes. This put interveners in a difficult position by forcing them to monitor multiple proceedings. Nonetheless, all parties appear committed to make the best of the situation. These issues should resolve themselves when the current design certifications are completed and subsequent COL applications reference certified designs.

Scheduling certainty and clarity of NRC management expectations are critical for the vendors. Some vendors believe that the NRC staff has not been consistent over time in the detail that is expected from the vendor. We were told that there have been situations in which different reviewers have caused confusion by applying different standards for review. Indeed, some vendors have complained that issues that were believed to have been resolved were subject to reopening as different reviewers became involved. We conclude that the Commission should focus its attention on providing clear guidance on the level of design detail and analysis that is expected in applications. We understand that the NRC staff is paying attention to this issue, and we bring it up here because we believe that this is an area where a continuing active focus by the Commission and NRC management is warranted.

Ensuring a sensible path forward for future reactor design modifications was also an issue of concern for some stakeholders. There is an inherent tension between the policy goals of, on the one hand, building a standardized fleet of new reactors and, on the other hand, ensuring that modifications based on experience with a design are applied so as to improve safety and environmental performance. We understand that at least one design center has created a committee to look at the issue of how best to incorporate new technology changes into future reactor construction. We believe this is a sensible step and the Commission should closely monitor progress to ensure that there is a transparent and efficient methodology to achieve an appropriate balance between these two important goals.

Combined Operating License

Although there have been occasional “bumps in the road” in the processing of COL applications, the fact that problems have surfaced was neither unexpected nor have the problems proven insurmountable. The general sense is that the NRC staff has generally worked with the applicants in a direct way to resolve issues in a timely fashion. Because there has not yet been a successful application that has gone through the entire process from beginning to end, applicants have no model upon which to base their submissions. Both applicants and the NRC are learning as the initial applications are processed. Not surprisingly, there on occasion have been differing expectations as to what is required. Once the process has run its course a few times, we expect that many of these issues will resolve themselves.

Nearly all the applicants indicated that certainty in scheduling is more crucial than speed. Nonetheless, although the Part 52 process largely serves to move regulatory decisions as early in the process as they can reasonably be made, there often are significant expenditures that must be incurred for long-lead-time components before the licensing process has been completed. With hundreds of millions of dollars at stake, even a small delay can have a significant financial impact. Therefore, efforts should be made to avoid unnecessary delays.

Several applicants questioned the need for a mandatory uncontested hearing – a hearing that is held even in the absence of a successful intervention by a party opposing a license

-- at the end of the COL process. They observed that there are multiple opportunities for public involvement and expert review in the current licensing process, and that the mandatory hearing requirement is an anachronism from an earlier age. They noted the public access that is now a standard part of the staff's review of the licensing application and the environmental impact statement and the detailed review that is undertaken by the independent experts on the Advisory Committee on Reactor Safeguards. As a result, they claim that a mandatory uncontested hearing is a duplicative and time-consuming step that serves little purpose. Some intervenor groups, on the other hand, point out that the industry has been successful in recent time in rehabilitating public support for nuclear power and that the quickest way to subvert that momentum would be to eliminate the mandatory hearing requirement or to otherwise limit the confidence of the public in the integrity of the licensing process.

We understand that a mandatory hearing on each application for a construction permit is required by the Atomic Energy Act and therefore it is beyond the authority of the Commission to eliminate it. However, even in the absence of a legislative change, the Commission can reduce the uncertainty associated with the duration of the hearing. For example, the Commission might convene a legislative-style hearing to ascertain the sufficiency of the licensing review. Rather than limiting public involvement, a legislative-style hearing might allow appropriate and efficient wide-scale scrutiny to supplement the staff and the ACRS's licensing review. Of course, such a hearing would be in addition to any detailed review of contentions by the Atomic Safety and Licensing Board (ASLB) in cases in which there has been a successful intervention.

Another major issue that was brought to our attention relates to the environmental review process. We understand that, at least in respect to the initial COL applications, the EIS process is currently more advanced than the safety review process. In these cases, any effort to "speed up" the environmental reviews will have no effect on the overall licensing schedule. This may not continue to be the case for other applications in the queue. That is, the time needed for the safety review of subsequent COL applications referencing a certified design will likely be reduced because non-site specific issues will have already been addressed. Thus, the timing of the environmental review may become a critical consideration going forward.

One suggestion offered in our meetings was to allow the filing of contested issues on the draft EIS, instead of waiting until the final EIS to issue. It was argued that such an approach would allow any ASLB hearing to start earlier. However, the draft EIS would have to be of high quality for this approach to be effective and there is no certainty that time would be saved for every application. For example, intervenors would retain the right to file contentions relating to issues arising from any changes introduced in the final EIS. And perhaps little efficiency might be gained if the concurrence by other agencies has not been obtained on the draft EIS. Experience going forward should indicate whether such a change in process would be helpful.

Our comment on this point reflects a general rule: the NRC and the other stakeholders should seek to learn from the existing processing of applications and should seek to achieve efficiencies based on that knowledge going forward. The overall aim should be to reduce the licensing burden without affecting the quality, scope or the thoroughness of the review. A commitment to learn from experience should be the guide.

Summary

In sum, we note that there was near-universal respect and admiration for the NRC staff among the stakeholders we interviewed. Although the licensing process is new, both the NRC and the industry have done a remarkable job in very trying circumstances in assuring the thorough and timely evaluation of license applications. The fact that all parties have experienced some problems in navigating the process was to be expected under the circumstances. But it is apparent that all those involved have been diligent in working through the issues in a forthright manner.

The Commission can, and should, continue to exercise clear leadership to ensure that the processing of the applications continues with the same attention to detail and to efficiency as has been the case to date. The Commission should ensure that the lessons learned in the first round of applications are rigorously applied to make the processing of subsequent applications more efficient. We also believe that the changes we outlined above would have a modest, but measurable impact upon the process.

On behalf of the Bipartisan Policy Center, we thank you for giving us the opportunity to assess the progress that has been made in laying the foundations for the deployment of safe nuclear power in the U.S. We commend you for your willingness to invite an independent analysis, as well as for your commitment to ensuring the transparency and integrity of the NRC licensing process. We hope that this review is helpful.



Pete V. Domenici



Dr. Richard Meserve

CC: George Apostolakis, Commissioner
CC: William Magwood, Commissioner
CC: William Ostendorff, Commissioner
CC: Kristine Svinicki, Commissioner

**Environment and Public Works Committee Hearing
May 5, 2010
Follow-Up Questions for Written Submission**

Questions for Meserve

**Questions from:
Senator Thomas R. Carper**

1. In the Bipartisan Policy Study, it was reported that the NRC has done a good job in handling of the new licensing process (citing that difficulties were caused by a new process), is that correct? What can the NRC do to make the process clearer for license applicants? What can the NRC do to help applicants and the NRC learn from their mistakes? Do you believe the new license process may actually be slowed down if the NRC were required to provide Congress with multiple different bi-annual reports every year on the status of the new license process?

Our review revealed a near-unanimous view that both the NRC and the industry have done a remarkable job in assuring the thorough and timely evaluation of license applications in very trying circumstances. The licensing process for new reactors that is now underway has been a learning experience for all involved and so the fact that there were some problems in navigating the process was not unexpected. Among the stakeholders we interviewed, there was widely held respect and admiration for the diligence, fairness, and competence of the NRC staff. The NRC was not seen to have needlessly delayed or extended the licensing process.

Our interviews also revealed that, on occasion, there has been some miscommunication between NRC staff and applicants, leading to some confusion and delay. Much of the confusion can probably be traced to misunderstandings as to NRC expectations with regard to the level of detail required in applications, particularly the level of specificity and analysis that is expected in certified design applications. Some reactor vendors believe that the NRC staff has not been consistent over time in defining the detail that is expected in an application. In our judgment, the current issues with the licensing process will likely resolve themselves as all sides gain more experience. We also recommend that the Commission and NRC staff strive to provide clear guidance to applicants to minimize delays caused by miscommunication as subsequent applications make their way through the process.

The Commission can, and should, ensure that the processing of the future applications benefits from the experience with the existing applications. We understand that the NRC staff has been tasked with conducting a lessons-learned analysis after the completion of the first few combined licenses. We believe this is an appropriate action, and that applicants and other stakeholders should be consulted in that process.

Our review did not directly address the role of Congressional oversight in ensuring continued improvement of the NRC licensing process. The issue was raised in a few of the individual

interviews, but was not discussed at the stakeholder forum. It is our view, however, that a requirement that the NRC provide the Congress with multiple different bi-annual reports should be undertaken only if the Congress believes that stringent and continuing oversight of the NRC is necessary. Our review did not suggest that the NRC's process for licensing new reactors warrants special concern at this time.

Senator James M. Inhofe

1. The Bipartisan Policy Center's assessment of the NRC's new plant licensing process included the observation: "Based on our interviews, we believe that the difficulty of obtaining financing is a bigger obstacle to nuclear plant construction at the moment than licensing issues." Investors often cite regulatory uncertainty as a financial risk for new plant development, yet the Center seems to downplay that link. Would please expand on the Center's view on how licensing issues may impact the ability of a project to attract financing?

Our review focused exclusively on the NRC's licensing process for new reactors, specifically whether there have been unnecessary delays in the process caused either by the NRC or by the nuclear industry. We did not find such delay. In the course of the interviews, a number of the stakeholders we interviewed did comment that the financing challenge, and not the licensing process, is currently the biggest obstacle to new plant construction. Even disregarding regulatory risk, financing is difficult in these economic times.

There no doubt is a relationship between regulatory certainty and the capacity to attract financing. The revised licensing process should serve to reduce the regulatory impact on financing decisions by moving regulatory decisions as early in the process as possible. Nonetheless, there is necessarily some regulatory scrutiny that must arise during and at the end of construction – that is, after substantial investment in the plant – creating some financing risk. As noted above, our interviews did not suggest that this regulatory risk is a significant factor in the current challenge of obtaining financing for new nuclear construction.

We also note that nearly all the applicants we interviewed indicated that certainty in scheduling is more important than overall speed of the license review. With confidence in the schedule, the applicant can make informed decisions as to whether and when to commit to acquire expensive long-lead-time components. Our suggestions for improving the licensing process are intended to ensure greater certainty in scheduling for subsequent applications.

Senator George V. Voinovich

1. **I appreciated the efforts of the Policy Center (Thank You), and was interested in the suggestions you had for enhancements to the process in your report. While recognizing that we need to try the process before we tinker with it too much, are there any improvements that you think should be looked at now by NRC, so we don't run into similar problems in the second set of applications?**

We believe that many of the problems encountered during the current set of license reviews should resolve themselves as both the NRC and the industry gain more experience. However, there are several potential changes to the overall process that we believe could improve the process. These include efforts to reduce the uncertainty associated with the mandatory hearing and to ensure efficient completion and review of environmental impact statements (EIS).

Several applicants questioned the need for a mandatory uncontested hearing, a hearing that is held even in the absence of a successful intervention by a party opposing a license, at the end of the Combined Operating License (COL) process. They argued that a mandatory uncontested hearing is a duplicative and time-consuming step that serves little purpose. On the other hand, some intervenor groups pointed out that the industry has been successful in rehabilitating public support for nuclear power and that the quickest way to subvert that support would be to eliminate the mandatory hearing requirement and thereby to limit the confidence of the public in the integrity of the licensing process.

The Commission does not have the authority to eliminate the mandatory hearing because the Atomic Energy Act requires a hearing. However, even in the absence of a statutory change, the Commission can reduce the uncertainty associated with the hearing. For example, the Commission might convene a legislative-style hearing to verify the sufficiency of the licensing review. Rather than limiting public involvement, a legislative-style hearing might allow appropriate and efficient wide-scale scrutiny to supplement the detailed licensing review undertaken by the staff and the Advisory Committee on Reactor Safeguards. Of course, such a hearing would be in addition to any detailed review of contentions by the Atomic Safety and Licensing Board (ASLB) in cases in which there has been a successful intervention. This is a change that could be implemented now, before the processing of the first wave of COL applications is complete.

Another potential area for improvement relates to the environmental review process. For the COL applications currently under review, the environmental review is proceeding more quickly than the safety review, and so any effort to "speed up" the environmental reviews will have no effect on the overall licensing schedule. This may not continue to be the case for other applications in the queue because the time needed for the safety review of subsequent COL applications referencing a certified design will likely be reduced. This is the case because non-site-specific issues will have been addressed in the design certification. Thus, the timing of the environmental review may become a critical consideration going forward.

One suggestion offered in our meetings was to allow the filing of contested issues on the draft EIS, instead of waiting until the final EIS is issued. It was argued that such an approach would allow any ASLB hearing to start earlier. However, the draft EIS would have to be of high quality for this approach to be effective and there is no certainty that time would be saved for every application. For example, interveners would retain the right to file contentions relating to issues arising from any changes introduced in the final EIS. And perhaps little efficiency might be gained if the concurrence by other agencies has not been obtained on the draft EIS. Experience going forward should indicate whether such a change in process would be helpful.

Senator CARPER. Good. Dr. Meserve, thank you so much.
Dr. Bradford, please proceed.

**STATEMENT OF PETER A. BRADFORD, ADJUNCT PROFESSOR,
INSTITUTE FOR ENERGY AND THE ENVIRONMENT,
VERMONT LAW SCHOOL; FORMER COMMISSIONER, U.S. NU-
CLEAR REGULATORY COMMISSION**

Mr. BRADFORD. Thanks very much for the invitation to testify today.

Regulatory oversight hearings are of special importance now. From the housing and financial sector collapses to the Big Branch coal mining disaster, to the spreading oil in the Gulf of Mexico, we see consequences of insufficient precaution and enforcement in the face of risks that were known or knowable.

The nuclear industry has shown that it is not immune. It will be kept safe by diligence and care and not by goals that emphasize growth or subsidy or governmental preference for a particular and a well established technology.

I have arranged my testimony in four parts. First, the interplay between the NRC licensing process and the cancellations, cost overruns and delays that have affected nearly all of the license applications pending before the NRC; second, the experience of citizen intervenor groups in the NRC licensing process, as revised since the last round of nuclear power plant construction; the third part remarks on areas of potential safety concern; and the fourth part reflects Vermont's recent experience with tritium leakage at the Vermont Yankee Nuclear Power Plant.

Almost all of the applications for nuclear power plant licenses that were said to constitute a nuclear renaissance have fallen significantly behind their original schedules. Some have been canceled outright. Many have seen significant escalations in their cost estimates. Several are not being actively pursued.

If the past is any guide, some will assert that the NRC is causing these delays and cancellations and that the dramatic cost overruns of the 1970s and 1980s were also caused by regulation and by delays brought on by licensing proceedings. No serious study of the causes of power plant delays confirms this, but the myth persists.

The NRC licensing process is not the cause of these delays and cancellations today either. The cost increases have nothing to do with licensing, nor do the decline in demand, the falling cost of alternatives, or the customer backlash against rising rates. Unwillingness by Wall Street and by vendors to assume economic risk is not traceable to the NRC.

In the years ahead, Congress will need to assure that the incentives for new reactors do not replicate the 2008 gold rush to the NRC's doors, overwhelming the goals of the revised licensing process and the NRC's own goals for sound regulation.

As the Subcommittee knows, the NRC licensing process has undergone major revision in the last decade, primarily to assure early resolution of as many issues as possible. To date, aspects of this process have not gone smoothly. A major difficulty is that individual construction and operating license applications are being reviewed before the generic designs that they referenced have been approved or even finalized. This situation reverses the process con-

templated when the new licensing rules were adopted, requiring participants in the COL proceedings to guess at the outcomes of the ongoing design proceedings.

A second goal of the revised licensing process—about which the Commission has generally not been candid—has been to reduce the ability of the public to question either applicants or the NRC staff. The potential weakness of most regulatory processes in banking, housing, coal mine safety and oil drilling, as well as nuclear regulation, is the extent to which these processes rely almost exclusively on information provided by the regulated entities. If regulators compound this weakness by treating other potential sources of information, such as citizens' groups, whistleblowers, State governments, with hostility, then they are asking for trouble.

The NRC has done this with new rules that prohibit cross-examination by parties to its proceedings in most circumstances as well as by sharply curtailing discovery rights. These rules, adopted against the strong recommendation of the Commission's own licensing board chairman, are absolutely inconsistent with the agency's core principles of good regulation: independence, openness, efficiency, clarity and reliability.

They are also potentially inconsistent with the behavior of an agency wise enough to welcome the skeptical function that an informed public can provide in an era of such widespread regulatory failure.

The final portion of my testimony discusses the events surrounding the highly publicized tritium leakage at Vermont Yankee. Four interrelated reasons explain the high visibility of these events. First, Entergy's Vermont Yankee personnel had repeatedly incorrectly assured the State of Vermont, at times under oath, that the plant had no underground piping system carrying radionuclides.

Second, Vermont Yankee had startled the public with a 2007 cooling tower collapse. Third, the leaking tritium, though not detected offsite, progressed rapidly from insignificant quantities to much larger concentrations. And finally, the Vermont Senate voted overwhelmingly against approving operation of the plant after its current license expires in March 2012.

The NRC has recently announced further reviews of its initiative in the area of groundwater protection. While the existing regulatory framework may be adequate, enforcement under it clearly leaves something to be desired. The public's tolerance for leaks of radionuclides from systems whose existence is denied by plant management before the event is inevitably low even when public safety is not directly threatened by the leaks.

The sense conveyed by these failures that the older plants do not have their act together has embarrassed the industry and the NRC in ways incompatible with licensing new units or extending the lives and increasing the outputs of the existing plants.

This completes my testimony.

[The prepared statement of Mr. Bradford follows:]

Testimony of Peter A. Bradford¹
Senate Committee on Environment and Public Works
Subcommittee on Clean Air and Nuclear Safety
Wednesday, May 5, 2010

“Nuclear Regulatory Commission Oversight Hearing”

I’ve arranged my testimony in four parts.

The first deals with the interplay between the NRC licensing process and the cancellations, cost overruns and delays that have afflicted nearly all of the license applications pending before the Nuclear Regulatory Commission.

The second part deals with the experience of citizen intervenor groups in the NRC licensing process as revised since the last round of nuclear power plant construction.

The third part remarks on areas of potential safety concern.

The fourth part, included at the Subcommittee’s request, reflects on Vermont’s recent experience with tritium leakage at the Vermont Yankee nuclear power plant.²

The NRC licensing process and the problems facing new nuclear plants

As recently as a year ago, the NRC website page entitled “Expected New Nuclear Power Plant Applications” listed a total of 23 applications covering 34 new reactors. Of these, 19 covering 29 units had been received, with the rest expected in 2009 and 2010.

A year later, the list of applications received is down to 17 applications for 26 units.³ None of the four expected applications have materialized, and none are now expected before 2011. Furthermore, the pace of the new applications toward actual construction is even slower than these changes suggest. Almost all of the plants have fallen well behind their original schedules. Most of them have seen significant escalations in their cost estimates. Several have been suspended and are not being actively pursued.

¹ Adjunct Professor, Vermont Law School; Former Chair, New York and Maine utility regulatory commissions; former Commissioner, U.S. Nuclear Regulatory Commission.

² I am one of three members of Vermont’s statutory Public Oversight Panel overseeing an audit of the reliability of the Vermont Yankee. However, I am not testifying on the Panel’s behalf. Indeed, the Panel has not yet completed its review of issues arising from the tritium leakage.

³ The NRC delists applications that have been received but later cancelled.

I have addressed the reasons for these developments elsewhere.⁴ For purposes of this hearing it is enough to note that the NRC licensing process is not the cause of these delays and cancellations. The cost increases have nothing to do with licensing. The decline in demand and the falling cost of alternatives clearly have nothing to do with the NRC. Customer backlash against rising rates, as has manifested itself in Florida and South Carolina is independent of the NRC. Unwillingness by Wall Street and by vendors to assume economic risk is not traceable to the NRC. Yet these are the basic reasons why the “nuclear renaissance” has slipped into reverse gear, sustained almost entirely by the hope of taxpayer backed loan guarantees.

An enduring myth arising from the last round of nuclear construction is that the dramatic cost overruns of the 1970s and 1980s were caused by regulation and by delays brought on by litigation in licensing proceedings. No serious study of the causes of power plant delays (and there were several) confirms this, but the myth persists.

Then as now, the basic cause of the delays was economic, as utilities stretched out construction schedules in the face of high interest rates and declining demand. In addition, some major plant specific mishaps = the Brown’s Ferry fire, the seismic equipment fiasco at Diablo Canyon, the sinking generator building at Midland, the quality assurance breakdown at Zimmer and of course Three Mile Island – contributed greatly. Blaming the NRC licensing process, which in its day licensed more plants than the next several countries combined, is a road to measures that neither fix the real problems nor guard against expensive and controversial repetition.

Instead, Congress should assure that the incentives it offers for new reactors do not replicate the 2008 gold rush to the NRC’s doors, overwhelming the goals of the revised licensing process and the NRC’s own goals for sound regulation.

The experience of citizen intervenor groups in the revised NRC licensing process

As the subcommittee knows, the NRC licensing process has undergone major revision in the last decade. A primary goal of these revisions has been to assure the early resolution of as many issues as possible, and to avoid relitigation of issues that the Commission has resolved as to generic reactor designs. To this end, the Commission has provided for combined construction permits and operating licenses (COLs) referencing generic designs approved through separate rulemaking proceedings. By itself, this new process is potentially sensible, but it does impose great responsibility on applicants to provide complete applications at the outset and to respond comprehensively to NRC questions. To date, this process has not gone smoothly.

The main difficulty is that individual COL applications are being reviewed before the generic designs which they reference have been finalized or approved. This situation, which results

⁴ “The Nuclear Renaissance Meets Economic Reality” Bulletin of the Atomic Scientists, November 2009, pp. 60-64 http://www.vermontlaw.edu/Documents/IEE/20100109_bradfordArticle.pdf.

largely from the deadlines for subsidy eligibility that were incorporated in the Energy Policy Act of 2005, is the reverse of the process contemplated when the new licensing rules were adopted. This unexpected development has had inefficient and burdensome consequences, requiring participants in the COL proceedings to guess at the outcome of the ongoing design proceedings. To further complicate matters, some applicants have changed their minds as to the type of design that they intend to build, laying waste to a good deal of the work to that point.

A second goal of the revised licensing process - about which the Commission has generally not been candid - has been to reduce the ability of the public to question either applicants or the NRC staff. A potential weakness of most regulatory processes - in banking, housing, coal mine safety and oil drilling, as well as nuclear regulation - is the extent to which they rely almost exclusively on information provided by the regulated entities. To some extent, this is inevitable, but if regulators compound it by treating other potential sources of information - citizen groups, whistleblowers, state governments - with hostility, they are asking for trouble.

The NRC has done this with new rules - some adopted by a divided Commission - that prohibit cross examination by parties to its proceedings in most circumstances, as well as by sharply curtailing discovery rights. Given that the government has never adopted the recommendations for assistance to qualified intervenors that were part of the independent reviews of the Three Mile Island accident, most intervenor groups lack the resources to hire teams of experts to conduct their own license reviews. They are heavily dependent on discovery and cross examination.

The Commission's actions in this area do not save time and expense. They were adopted against the strong recommendation of the Commission's own licensing board chairman.⁵ It is difficult to avoid the conclusion that their real purpose is to avoid embarrassment to the industry and to the staff. Needless to say, this is absolutely inconsistent with the agency's core principles of good regulation - independence, openness, efficiency, clarity, and reliability - as highlighted in the Subcommittee's April 28 letter of invitation. It is also inconsistent with the behavior of an agency wise enough to welcome the skeptical function that an informed public can provide in an era of such widespread regulatory failure.

The new licensing process was always going to make public involvement more complicated. By separating design review from individual licensing proceedings, it assured that many issues would be resolved before the public at specific sites were aware that their interests were affected. Compounding these effects by hamstringing public involvement in the licensing proceedings themselves was never wise. It has now been compounded by the unintended rush of COL applications ahead of generic design reviews.

⁵ Memorandum from G. Paul Bollwerk, III, Chief Administrative Judge, to NRC Commissioners, re: ASLBP Comments on SECY-00-0017, "Proposed Rule Revising 10 CFR Part 2 - Rules of Practice (February 10, 2000) ("ASLBP Memorandum").

The fairness of the resulting proceedings would be an excellent area for close Congressional review in the years ahead.

Areas of potential safety concern

I have not been personally involved in the safety regulation of nuclear power plants for many years. In preparation for this hearing I did consult with David Lochbaum, a nuclear engineer who has worked in nuclear power plants and for the NRC. He is currently in charge of the reactor safety program at the Union of Concerned Scientists. I urge the subcommittee to hear from Mr. Lochbaum directly. The issues that he flagged as being of current concern include

- Pressure boundary leakage – Recently at Davis-Besse – the same plant that experienced potentially catastrophic vessel head degradation in 2002 – water again leaked from metal tubes passing through the vessel head. Apparently the NRC again did not enforce the license condition requiring shutdown within six hours of discovery of pressure boundary leakage. The same failure of enforcement has occurred at other pressurized water reactors.
- Fire protection – During my term on the NRC, we adopted fire protection regulations arising from the 1975 fire at Brown's Ferry in Alabama. Few, if any reactors comply with them today. The NRC has since moved to options based more on risk assessment but here too compliance remains a problem at many plants. Congressional oversight requiring compliance by a date certain would be a useful indication that this crucial area needs to be brought to closure.

Mr. Lochbaum also flagged the issue of groundwater protection as being of generic concern because the NRC has not enforced its general design criteria requiring that releases of radioactivity can only be by controlled and monitored pathways. This issue is discussed further in my testimony relating to Vermont Yankee.

Vermont's recent experience with tritium leakage at the Vermont Yankee nuclear power plant

At the subcommittee's request, this portion of my testimony discusses the events surrounding the highly publicized tritium leakage at Vermont Yankee. Because the events in question are still under review by several state entities – including the Public Oversight Panel on which I serve – my comments should be regarded as subject to change in light of subsequent information. They should also not be taken as representing the views of the Public Oversight Panel or any other body.

Although tritium leakage has been problem at many nuclear reactor sites, the Vermont Yankee case has captured by far the most attention. There are three interrelated reasons for this. First, Entergy's Vermont Yankee personnel had repeatedly assured the state of Vermont – at times under oath - that it had no underground piping system that carries radionuclides. Second, the leaking tritium – though not detected offsite – progressed rapidly from insignificant quantities to much larger concentrations, even as Entergy searched for the source and admitted the existence of the piping systems whose existence it had previously denied. And finally the Vermont Senate, alarmed by the first two events voted overwhelmingly against approving operation of the plant after its current license expires in March, 2012.

Entergy has recently released a report prepared by an outside law firm. That report “did not find that any Entergy personnel or representative intentionally misled third parties about the existence of underground piping at VY that carries radionuclides. Although the Investigator did not find a basis to substantiate intentional wrongdoing..., the Investigator found that certain ENVY personnel failed at times to clarify understandings and assumptions and therefore allowed statements to be made that were incomplete or inaccurate when viewed in a context different from (the one in which the statements were originally made).”

Entergy has also reassigned several of the individuals involved in these misstatements.

The action by the Vermont Senate arises from circumstances that are, as far as I know, unique to the state of Vermont. As a result of an agreement reached between Vermont and Entergy in 2002, when Entergy acquired the plant, operation after March, 2012 requires a certificate of public good from the State of Vermont. Vermont law prohibits issuance of such a certificate without legislative approval, which must come from both houses of the legislature independently. Thus the Senate vote alone is sufficient to withhold the needed approval. The House has not acted. It is possible for the issue to be revisited during the 2011 legislative session.

For purposes of today's hearing, these events do not directly involve the NRC. The concentrations of tritium detected in the wells at the plant did rise above levels requiring reporting both to NRC and to EPA, and reviews at both the state and federal levels are continuing.

The NRC has recently announced further review of its initiatives in the area of groundwater protection. While the existing regulatory framework may be adequate, enforcement under it clearly leaves something to be desired. Adequate knowledge of plant configurations and pathways in the oldest units has always been a problem, especially in systems not directly relevant to safety. The public's tolerance for leaks of radionuclides from systems whose potential to leak radionuclides is denied by plant management before the event is inevitably low, even when public safety is not directly threatened by the leaks,

* * * * *

The cusp between high developmental hopes and the mundane and expensive requirements of regulatory diligence is a dangerous place. All around us now – from the housing and financial sector collapses to the Big Branch coal mining disaster to the spreading oil in the Gulf of Mexico, we see consequences of insufficient precaution in the face of risks that were know or knowable. The nuclear industry has shown that it is not immune. It will be kept safe by diligence and care, not by goals that emphasize growth, subsidy and governmental preference for a particular, well-established technology.

Senator CARPER. Thank you, Dr. Bradford.
Dr. Singh.

**STATEMENT OF K.P. "KRIS" SINGH, PRESIDENT AND CHIEF
EXECUTIVE OFFICER, HOLTEC INTERNATIONAL**

Mr. SINGH. Thank you, Chairman Carper. It is my pleasure to provide my perspective on the U.S. NRC and what may be done, particularly to help the people who have been the nuclear industry and now are kind of on the sidelines, namely the American worker.

We have manufacturing facilities all over the United States. We have offices in New Jersey, in California. We also have manufacturing plants in Pennsylvania, in Pittsburgh, in Ohio, in Orrville, Ohio, and in Florida.

These plants are where our people work, where most of our employees are. And their livelihood depends on where the nuclear industry goes, how it develops, and whether they will be able to apply their trades and their craftsmanship in the industry.

We maintain one of the largest plants in the United States that manufactures nuclear power plant equipment in Pittsburgh, Pennsylvania. And we manufacture equipment there to all national and international codes, and we ship it all over the world.

We are particularly known in the field of spent fuel, which was discussed here with some passion earlier in the testimonies. My appeal to the leadership in the country, and particularly to you, Mr. Chairman, is to not give up on technology. As we discuss the issue of spent fuel, we should also realize that people like us, with dirt behind our fingernails, are trying to make things better so fuel can be stored for a much longer time at the nuclear plants.

We last year licensed an underground storage system where fuel would be completely underground in canisters. And we anticipate, our initial calculations show that that configuration will be stable with guaranteed absence of release [of radioactivity] for as long as 500 years.

So the technology is moving forward. We should keep faith in the developments that are occurring, and I believe spent fuel will not be a problem for the growth and rise of the nuclear industry.

But my central focus of this testimony is to present to you some problems that we face as exporters of nuclear equipment to overseas markets and as employers of American workers. One of our missions is to create jobs and we have been, I am glad to tell you, creating jobs even through this recession.

We opened a plant in Orrville, Ohio, recently that we are increasing employment. It will go up to some 300 employees by the end of the year. The problem we have is that our export applications to the NRC, the applications for licensing equipment for export, go to the back of the bus. It does not get reviewed promptly, and our competitors overseas know it. They in competing against us inform the host country that if you buy from the American supplier, you are not going to get the licensed equipment in time, and time, of course, is of the essence.

So what I am asking here is to direct the NRC that if we file applications for export to overseas markets, that they do get a high priority for review. Otherwise, it directly costs jobs in this country. It is a direct loss of jobs.

The other point I would like to make is our companies here, no offense to George, are foreign-owned. Their ownership is no longer in the United States. And they do look at the market internationally. I believe and the initial evidence is that custom manufacturing work in the United States will not occur. Most of the work that will be generated from nuclear renaissance will in custom manufacturing of equipment components will go overseas. It already is, which means the plants where we employ people, we will not be able to boost employment, and this bad unemployment situation that exists right now will not be alleviated.

When we put out ads for employees, for workers in Ohio, for every position we advertised, we had 200 to 300 applicants. That is how bad it is. And in the middle of all this, we are shipping work that is going to be developed here with government loan guarantees to go overseas. And I don't think that is terribly smart for any country. The U.S. seems to be the only country following that policy.

So my request to you is to direct the regulatory powers of the NRC to help creating employment here, to help maintain our manufacturing know-how in this country so we don't complete de-industrialize ourselves.

Thank you.

[The prepared statement of Mr. Singh follows:]

Written testimony to the Senate Subcommittee on Clean Air and Nuclear Safety for the hearings on “Oversight: Nuclear Regulatory Commission”, Washington, D.C., May 5, 2010

By

Dr. K.P. (Kris) Singh, President and CEO, Holtec International, Marlton, NJ, USA
(k.singh@holtec.com)

Honorable Chairman Carper, Ranking Member Vitter and members of the Subcommittee:

I am Kris Singh, President and CEO of Holtec International, an energy technology company that I founded in 1986. Holtec International has major operation centers in Jupiter (Florida); Marlton (NJ); Pittsburgh (Pennsylvania); Orrville (Ohio); Lakeland (Florida); San Diego (California); and Kiev (Ukraine). Of these locations, the Lakeland (Florida); Orrville (Ohio); and Pittsburgh (Pennsylvania) sites host our manufacturing facilities where components and materials for the nuclear power industry are manufactured. Our manufacturing plant in Pittsburgh is one of the largest in the U.S. with all nuclear Code stamps and certifications for manufacturing nuclear power plant components.

It is my pleasure and my privilege to offer my perspectives to the subcommittee on the Nuclear Regulatory Commission with which we have extensive interactions in all aspects of our work. Our company maintains several active dockets with the NRC with a perpetual stream of ongoing licensing requests to certify our equipment designs which we then manufacture and sell to customers around the world. In particular, our company is a major supplier of capital goods and services for storing spent nuclear fuel to nuclear power plants in the U.S. and abroad. Much of what we do in the nuclear industry is subject to NRC's review and oversight. Our interface with the NRC is especially broad because our company not only designs but also manufactures its engineered equipment. We even manufacture certain specialty materials based on our patents in our own factories that are necessary for reactivity control in nuclear power plants and which require NRC's certification. A business unit in our company also performs site construction services at nuclear power plants under the regulatory gaze of the NRC. We are America's largest exporter of capital equipment to store and transport used nuclear fuel. In most cases the importing country, such as China, demands that custom-engineered equipment for their specific needs be licensed by the exporter's regulator, even if the equipment will not likely be used at a plant in the exporter's home country. For us, that means obtaining approval from the NRC for virtually all of our overseas-bound equipment. In fact, the foreign countries prize the stamp of approval by the NRC over any other national regulator. Those countries with significantly large economies and well developed domestic regulatory infrastructures view NRC's approval as the definitive endorsement of a product for their own use, which is an implicit recognition of the high caliber of regulatory work carried out by the NRC.

I note with some satisfaction that NRC's staff and management have visited our factories in Pittsburgh, Pennsylvania, and Lakeland, Florida on several occasions to obtain first-hand

knowledge of our manufacturing techniques and also to make their triennial *inspections* to evaluate the status of our regulatory compliance. I believe a tour of our factories by members of the NRC's organization invariably helps in connecting the effect of their regulatory policies and actions with the real hardware and the employment situation in the local communities where the factories are located. As I explain later, there is a strong nexus between NRC's policies with respect to their review priorities and the health of the nuclear equipment manufacturing segment of our economy. Explaining this nexus and recommending the measures that can be undertaken to improve the parlous state of the U.S. manufacturing base is a central element of my testimony to the subcommittee.

Plainly stated, those of us who export to foreign markets are severely handicapped by a lack of NRC policy giving priority to reviewing applications for export of capital equipment. Under their current process, the NRC gives the lowest priority in its review queue (work backlog) to licensing applications that are for export of equipment to foreign countries. This is precisely the opposite situation to our foreign rivals, who get the appropriate priority from their respective domestic regulators. Because most projects are time sensitive, our overseas customers are often reluctant to place orders with us knowing that our U.S. regulator will not prioritize our license application. If NRC gave appropriate priority to our applications for export equipment, we would benefit in the competitive bids because of NRC's platinum reputation for rigor and objectivity. Instead, our bidding effort is undermined in the eyes of the overseas customer. This situation is adverse to our national interest because we lose the bids that directly cost engineering and manufacturing jobs in America.

Anyone who visits the towns and communities where factories that once built equipment for America's and much of the world's nuclear plants knows the shriveling of our national manufacturing base that has been occurring. The decline was slow and decorous in the 90s, now it is steep and devastating, both in terms of our manufacturing base and manufacturing know-how. I agree with President Sarkozy of France, who said not too long ago, (I quote) "when manufacturing goes, everything goes". Well in America, manufacturing is going; it is going down fast and it is going down with a whimper. I would be remiss if I did not bring the irony of this sad debacle of custom manufacturing in our country to your attention, explained the underlying cause, and suggested measures that this subcommittee may take to help arrest the free fall.

Let us take a look at our government's admirable decision to provide loan guarantees for construction of new nuclear plants. The guarantee will undoubtedly spur construction of new nuclear plants. Unfortunately, however, the initial evidence suggests that the nuclear renaissance is likely to largely bypass the U.S. manufacturers of equipment. As matters stand today, most of the equipment for the new plants will be procured from overseas suppliers. Stated bluntly, American money will provide stimulus to overseas economies while American manufacturing withers. The giant multinationals that control large swaths of the U.S. nuclear industry, however, face no disincentive in carting off the manufacturing work to the foreign shores. The welders, fitters, and machinists numbering in tens of thousands – heirs to the men and women who built the ships, submarines, and planes during the second World War to protect our freedom – are deprived of the opportunity to practice their craft while the prime contractors hired to build our new nuclear plants scour overseas lands for the sweetest business deals. While the American

factories teeter on the brink of bankruptcy and dissolution for lack of work, the work goes to the home countries of the multinationals or to the countries that offer most sweeteners to the buyer. This situation exists in other areas of our economy as well which are outside of the scope of this subcommittee (such as solar energy), so I will not dwell on them here. However, I find the ongoing exclusion of the American manufacturers from the opportunities arising from the nuclear renaissance to be particularly galling. Who would have thought that President Eisenhower's Atom for Peace program that seeded nuclear know-how in Europe and made possible the rise of large nuclear companies in Europe and now in Asia, would, in a perverse irony, be the destroyer of American jobs for building America's own nuclear plants? The reason behind the ongoing export of American manufacturing jobs is twofold: First, the prime contractors for the new nuclear reactors, for the most part, are themselves foreign owned and controlled, and second, there is no regulatory disincentive to procure critical equipment from distant lands far away from the NRC's inspectorates.

The nuclear multinationals have benefited hugely from the technical know-how generated at our national laboratories and other research institutions, much of it funded by the NRC. Hundreds of codes, standards, and guidelines developed in the U.S. have made safe nuclear energy possible in all corners of the world. I hasten to add that a free and unfettered marketplace wherein every company competes on an equal footing is a fundamental strength of our economy. I don't advocate giving sheltered markets to our domestic companies such as our own but sadly, some of our putative international allies do. I am a firm believer in free and fair competition. But I also consider it patently fair that the companies that ship American jobs in the nuclear sector abroad should be sent to the back of the NRC's review queue when they file for license approvals from the NRC. At the present time, the situation is just the opposite: if a company goes to the NRC for licensing a component for export, its application goes to the back of the line. If a company – domestic or foreign owned – files a license application for use in the U.S., it goes to the front of the line even if the applicant intends to farm out all of the manufacturing work overseas. I humbly submit that a policy that does not take account of the livelihood of the American worker in an industry whose very existence owes to the generosity of the American taxpayer is a flawed policy. I believe setting NRC's application review policy to accord with our domestic employment objectives will give a business reason to those in the nuclear industry who view the continuing hemorrhaging of American manufacturing jobs nonchalantly, to begin thinking seriously about getting their nuclear plant hardware made in America.

The first of the five Principles of Good Regulation that guides the NRC is Independence. In my view, the NRC should be given very high marks for Independence. The guiding principles, however, also state that (I quote) "...independence does not imply isolation. All available facts must be sought from licensees and other interested members of the public...". In the spirit of this guidance and the second principle - Openness - I propose that the subcommittee establish a *Stakeholders Advisory Committee* that provides regular inputs to the NRC to enable the Commission to maintain the highest levels of adherence to its guiding principles and responsiveness to our strategic national objectives. A formal process may be created that enables a periodic feedback from the stakeholders to the Clean Air and Nuclear Safety Subcommittee on the recommendations of the Stakeholders Advisory Committee to the NRC.

Had such a stakeholder's committee existed today, I believe, it would have counseled the NRC on the need to be vigilant in upholding its standards on Reliability (the fifth principle) in the wake of the massive ongoing retirement of seasoned staff and recruitment of new replacement staff. There is widespread concern in the industry that the NRC's technical positions on some critical areas are drifting into a state of confusion. Such developments are inconsistent with the notion of Reliability, which (I quote) holds that "Once established, regulation should be perceived to be reliable and not unjustifiably in a state of transition." According to my colleagues in the industry, the Stakeholders Advisory Committee would serve to interact with the Commission in other topical areas of industry interest such as timeliness of licensing, alleviating regulatory burden on construction activities, standardization of manufacturing requirements and the escalating cost of NRC review fees.

The above said, I also believe that, based on my decades of experience with regulators in different countries, the NRC is by far the best nuclear regulator in the world. We have been suitably impressed with the assiduous review of our application to store canisterized used fuel in underground silos which the NRC approved last year and which is a transformative technology for achieving the ultimate safety in on-site or away-from-reactor storage of spent fuel. Recently, the NRC also approved our patented nanotechnology-based neutron absorber that will make it possible for nuclear plants to transfer fuel from their pools to dry storage on a much faster schedule than is presently possible. Our new material is now ready to be used to speed up the defueling of pools, which has been identified by the NRC as a worthy safety initiative. Such groundbreaking licensing approvals are the unmistakable hallmark of a capable and effective regulator. My proposals in this testimony are accordingly intended to help the NRC become even better at realizing its mission and serving the public good. Continuous improvement in any organization is the only antidote to apathy and decline, and this dictum applies to the NRC as well.

In summary, I request the Subcommittee to consider the following:

1. Instruct the NRC to prioritize review of licensing applications based on the extent of manufacturing that will occur in the United States.
2. Establish a Stakeholders Advisory Committee to help provide input to the NRC leadership to help maintain a heightened adherence to the five Principles of Good Regulation, namely, Independence, Openness, Efficiency, Clarity, and Reliability. Alternatively, the NRC could seek stakeholder feedback in an ad hoc manner (without a formal advisory committee) on an annual basis and report to the Subcommittee.

Thank you for your valuable time and your audience.

Senator Carper's Questions

Question 1

You commented that NRC needs to better support U.S. exports and manufacturing competitiveness through its licensing program. What specific changes in NRC policies would you recommend to boost manufacturing? Could you give me some examples?

Response to Question 1

I recommend that the USNRC adopt the following policy to promote domestic manufacturing of nuclear power plant components and systems:

“The USNRC shall give priority to review of those licensing applications for nuclear installations (such as nuclear reactors, fuel enrichment facilities, reprocessing facilities, and used fuel storage installations) in which the applicant commits that at least 70% of the manufactured capital equipment, machinery, and systems purchased in each calendar year needed for the facility shall be of domestic origin”.

I believe that the above policy will provide the necessary incentive to the multinationals active in our industry to place contracts within the United States. The above policy will also induce them to purchase from U.S. suppliers for the nuclear facilities that they sell overseas on the strength of USNRC's license.

I recommend the above policy because I believe it is only fair and appropriate that the USNRC, supported by the U.S. taxpayer, give priority to activities that foster employment in the U.S. You probably know that our international trading partners demand that we implement a “localization of manufacturing” in their country if we are to do business with them. We are being forced to share our intellectual property with local suppliers as a condition of contract with many of our largest trading partners. Others use their national regulator to make our entry into their markets onerous. I do not advocate protectionism. We must welcome the foreign-owned businesses to compete with our domestic companies: maintaining an open and competitive marketplace (the “American Way”) is important to our prosperity. However, thanks to the U.S. taxpayers and the quality of our national governance, the USNRC has become the gold standard of regulatory work in the world. It is only fair and proper that such a valuable national resource be directed towards promoting jobs here in America, especially when our international trading partners use various measures to boost manufacturing in their countries.

Question 2

Could you clarify whether the U.S. nuclear industry buys or plans to buy most of its equipment from overseas suppliers? Or are the majority of components, materials and services for the U.S. nuclear industry procured from U.S. facilities? What policy initiatives are needed to strengthen the U.S. nuclear manufacturing industry and build more American jobs?

Senator Carper's Questions (continued)**Response to Question 2**

The data on the procurements being made by the U.S. reactor suppliers (all of whom are now foreign controlled) is not publicly available. These companies guard such information closely. But we have sufficient evidence to deduce that a great majority of the capital equipment and machinery purchases for the new U.S. nuclear plants are being made in foreign countries. I believe that unless the cost of freight to ship the component from overseas is too steep, the manufacturing work for building new nuclear plants is heading to overseas sources. Indeed, the only portion of nuclear plant work that is assured to be performed by domestic labor is site construction. In my view, the exportation of skilled jobs in the nuclear power industry not only worsens the domestic employment situation but also acts to weaken America's manufacturing prowess, and harms our national security.

This hemorrhaging of U.S. manufacturing work is also occurring, as you rightly observed during the hearings, in other sectors where the government is providing loan guarantees. Solar energy, in which our company is also active, is a familiar case in point for us.

Senator Voinovich's Question

Question 1

I strongly share your view that the U.S. industrial base in manufacturing and fabrication technologies needs to be invigorated and ready to support the development of new and innovative reactors.

I'm intrigued by your suggestion of a "Stakeholders Advisory Committee" to help provide input to the NRC leadership on American jobs and other matters. I believe that this could help inform NRC's prioritization of new reactor applications, even while recognizing that NRC seems to hold a lot of public meetings and workshops, and seems to provide many opportunities to receive feedback from its stakeholders. It seems to me that this group could be formed today and that both NRC and this Sub Committee would be interested in its views.

Is there any reason that you (or another organization) could not form such an advisory group today and provide that input to NRC?

Response to Question 1

Thank you, Senator, for your words of support for the idea of establishing a Stakeholders' Advisory Committee to help provide input to the USNRC leadership in matters vital to our national objectives. The area of the committee's advice should, in my humble opinion, be directed towards helping the USNRC play a key role in increasing the participation of U.S. manufacturers in the "new build" program, helping the rise of U.S.-designed innovative small reactors to recapture America's leadership in commercial nuclear technology, and helping to open foreign markets to American goods in the nuclear industry. I truly believe that the USNRC can play a huge role in the revival of America's nuclear manufacturing base. The goals and objectives of such a committee will have to be carefully set down and justifiably focused on rescuing our fading industrial base without being protectionist or discriminatory. The USNRC has an admirable practice of seeking public input in open forums. However, such fora are not conducive to a focused interaction on American jobs or America's strategic interests in commercial nuclear energy. I envision the Advisory Committee to serve as the group of industry leaders that helps identify the (internationally lawful) measures that the USNRC can take to promote domestic employment and domestic innovation in the nuclear power sector.

Such a committee will be effective in its mission only if it is sponsored in some fashion by the Senate subcommittee and is embraced by the USNRC's leadership. At the Senate's direction, I would be pleased to assist in the creation of the Stakeholders' Advisory Committee so that its work in providing advice to the USNRC leadership is constructive and focused and serves our national interests.

Senator CARPER. Thank you very much for that message.
Mr. Vanderheyden, welcome. Please proceed.

**STATEMENT OF GEORGE VANDERHEYDEN, PRESIDENT AND
CHIEF EXECUTIVE OFFICER, UNISTAR NUCLEAR ENERGY, LLC**

Mr. VANDERHEYDEN. Thank you, Chairman Carper, and thank you for the opportunity to testify on the future of new nuclear energy and the critical role of the Nuclear Regulatory Commission's new licensing process, 10 CFR part 52.

This oversight hearing demonstrates your commitment to refocus attention on performance and provide a sense of accountability.

My name is George Vanderheyden. I am the President and Chief Executive Officer of UniStar Nuclear Energy, a strategic joint venture and an American company between Constellation Energy and EDF Group. I have been working in the nuclear industry for over 30 years.

UniStar was formed after the passage of the Energy Policy Act of 2005 to support and advance the development of a fleet of new nuclear energy facilities. To date, UniStar and our partners have submitted four combined license applications to the NRC for nuclear energy facilities in Maryland, Pennsylvania, Missouri and New York.

The United States has not built a new nuclear energy facility in more than 30 years. Given this fact, the Federal Government has attempted to address two historically problematic issues: the ability to finance the facilities and the regulatory uncertainty of obtaining a Federal license for construction and operation of the plant.

The Federal Loan Guarantee Program is an important first step at addressing the financial challenges of raising the investment capital. UniStar's proposed Calvert Cliffs 3 project in southern Maryland remains one of the three projects under consideration for a share of the remaining congressional appropriation.

My testimony today is based on UniStar's experience as a current participant in the NRC's licensing process. The Part 52 process allows the NRC to issue a single license before the start of construction to ensure that licensing issues are addressed prior to significant expenditures. While this process holds much promise, it has never been fully executed.

Our interactions with the NRC staff have been professional and transparent. The NRC is using new project management tools such as resource loaded schedules and earned value metrics to manage and monitor the simultaneous licensing of 13 independent applications.

I am encouraged by the high level of commitment demonstrated by the NRC staff to act in a fair and consistent manner, and it is my judgment that they are meeting their principles of good regulation.

However, in terms of planning of a project of this magnitude, the most critical milestone is the issuance of the combined license by the NRC. As of today, the NRC has not provided a target combined license issuance date for any of our projects. It is not our intent to expedite the review process in a way that would compromise safety or lose the public's confidence in the NRC. The goal should be to

create a predictable process that results in a reasonable certainty for the start of safety related construction for project applicants.

Second, as in all major projects, there is an opportunity to improve and to capitalize on lessons learned from the initial licensing efforts. There is not enough detail provided to the applicant in the current NRC scheduling process. This lack of detail inhibits the development of comprehensive lessons learned and improvements to the efficiency of future licensing efforts.

We believe that this commitment to a rigorous lessons learned process and self-assessment could result in reducing the NRC review time for the next wave of combined license applications from approximately 42 months to as little as 24 months.

I believe that the NRC's principles of good regulation provide an appropriate self-assessment mechanism for the Commission and the NRC staff. Therefore, I encourage you to request the NRC to provide quarterly feedback to this Subcommittee on how the NRC comports with these principles in the new licensing process.

This should be coupled with public and industry comments on the NRC's performance, as well as periodically holding license applicants such as UniStar Nuclear Energy accountable to the timely implementation of the new license process.

We are working with the NRC staff to improve efficiency by examining opportunities for schedule acceleration and to create schedule certainty. We support the Commission's ongoing independent examination of the license hearing process to identify ways to improve and streamline.

A similar effort in 2009 was successful in significantly reducing the duration of the certified design rulemaking process. We believe such opportunities also exist for the combined license process.

In closing, I would like to thank the Subcommittee. We have an opportunity as a Nation to create jobs, stimulate the economy, rebuild the domestic manufacturing infrastructure, and curb greenhouse gases with nuclear energy. UniStar and its partners have already invested in the creation of 850 jobs in Maryland, Virginia and North Carolina. In addition, our partner, Alstom, is investing \$200 million and creating 350 manufacturing jobs in Tennessee, while AREVA is investing \$360 million and creating 500 jobs at Newport News.

Mr. Chairman, I have submitted greater detail in my written statement, but that concludes my prepared remarks. I am available for questions.

[The prepared statement of Mr. Vanderheyden follows:]



WRITTEN STATEMENT FOR THE RECORD
by
George Vanderheyden
President and Chief Executive Officer of UniStar Nuclear Energy, LLC
to the
Subcommittee on Clean Air and Nuclear Safety
U.S. Senate
May 5, 2010

Chairman Carper, Ranking Member Vitter, Members of the Subcommittee, thank you for the opportunity to testify on the future of new nuclear energy and the critical role of the Nuclear Regulatory Commission's (NRC) new licensing process: 10 CFR Part 52. This oversight hearing demonstrates your commitment to provide periodic assessments that help ensure involvement of all stakeholders, refocus attention on performance and goals, and provide a sense of accountability and responsibility.

My name is George Vanderheyden. I am the President and Chief Executive Officer of UniStar Nuclear Energy, a strategic joint venture between Constellation Energy and EDF Group. UniStar was formed after the passage of the Energy Policy Act of 2005 to support and advance the development of a fleet of nuclear energy facilities in the United States. To date, UniStar and our partners have submitted four combined license applications to the NRC to construct and operate nuclear energy facilities in Maryland, Pennsylvania, Missouri, and New York.

UniStar is committed to a fleet of new reactors and, therefore, I also represent the interests of future nuclear projects that will follow the first wave of applications. I should mention that I had the opportunity to provide input to the Bipartisan Policy Center's 2010 independent review of the NRC licensing process for new reactors and I agree with their overall assessment.

It is important to note that the United States has not licensed or built a new nuclear energy facility in more than 30 years. Given this fact, the federal government has attempted to address two historically problematic issues: the ability to finance the facilities; and the regulatory uncertainty of obtaining a federal license for construction and eventual operation of the plant.

The federal loan guarantee program is an important first step at addressing the financial challenges of raising the investment capital. UniStar's proposed Calvert Cliffs 3 project in Maryland remains one of three projects under consideration for a share of the \$10.2 billion remaining in Congress's original appropriation of \$18.5 billion in guarantees for advanced nuclear energy projects.

The following table highlights Calvert Cliffs 3 loan guarantee chronology:

Year	Date	Loan Guarantee Chronology
2005	08/08/05	President George W. Bush signs the Energy Policy Act of 2005 into law
2008	07/31/08	Calvert Cliffs 3 Loan Guarantee Application (Part I) submitted to Department of Energy
	12/18/08	Calvert Cliffs 3 Loan Guarantee Application (Part II) submitted to Department of Energy
2009	05/19/09	Calvert Cliffs 3 among four projects selected by Department of Energy to enter final phase of due diligence

The issuance of the NRC Part 52 licensing process, which the NRC commissioners earlier discussed, was designed to address regulatory uncertainty. My testimony today is based on UniStar's experience as a current participant in the NRC licensing process. UniStar's Calvert Cliffs 3 combined license application under Part 52 was submitted to the NRC on March 14, 2008.

Since the enactment of the Atomic Energy Act of 1954, there has never been such a significant change in regulatory framework as was created by the Part 52 process. The Part 52 process allows the NRC to issue a single license, at the beginning of a project before the start of construction, to ensure that licensing issues are addressed prior to significant expenditures. While this process holds much promise, it has never been fully exercised for assessing a combined license application.

Our interactions with the NRC staff have been professional, timely, open, transparent, predictable, and valuable. The NRC is using new project management tools, such as resource loaded schedules and earned-value metrics to manage and monitor the simultaneous licensing of over seventeen independent Part 52 applications. The NRC has demonstrated its ability to be a learning organization, to be insightful, and able to create a culture of continuous improvement. This is in contrast to the management of license applications in the 1960s and 1970s. The NRC is performing well overall, and it is my judgment that they are meeting their Principles of Good Regulation.

In terms of planning a project of this magnitude, the most critical milestone is the issuance of the combined license from the NRC, which allows the start of safety-related construction of the facility. However, as of today, the NRC has not provided a specific combined license target issue date. As with any project of this size and overall importance to the energy objectives of our nation it is reasonable to establish an end goal to which all parties are working to meet. It is not our intent to expedite the review process in a way that would compromise safety or lose the public's confidence in the NRC. The goal is to create a predictable and efficient process for the current and future project applicants.

Secondly, as in all major projects, there is opportunity to improve and capitalize on the lessons learned from the initial licensing projects. The way to develop a comprehensive lessons-learned initiative is to

provide objective data which will enable the process to detail why items are completed early or late. The nuclear industry has demonstrated the merit of applying lessons learned in its operations by improved capacity factors and fleet efficiencies. The NRC recently provided UniStar with only limited portions (approximately 85 milestones) of their 1,000-activity schedule for Calvert Cliffs 3 combined license application. Not having detailed knowledge of activities needed for the NRC's review milestones, coupled with the large uncertainty in the remaining review activities, challenges any applicant's ability to prioritize the deliverables to best support the NRC staff, and in having a precise date for the start of safety-related construction. This lack of detail inhibits the licensing process from developing comprehensive lessons learned, limiting overall process improvement, and reducing efficiency.

We believe that this commitment to continuous improvement could result in reducing the NRC review time for the next wave of combined license applicants, from approximately 42 months to as little as 24 months. However, this will only be possible through the application of the Principles of Good Regulation - independence, openness, efficiency, clarity, reliability, and I would add greater schedule transparency. Another key element of openness, demonstrated through this hearing, is Congressional oversight which provides appropriate examination and guidance.

I believe that the NRC's Principles of Good Regulation are designed such that they would lend themselves to an appropriate self-assessment mechanism for the Commission and NRC staff. Therefore, I encourage you to request the NRC to provide annual feedback to this Committee on how the NRC comports with these principles in the 10 CFR 52 new licensing process. This should be coupled with public and industry comments on the NRC's performance, as well as periodic hearings which could afford you the opportunity to hold license applicants accountable as well to the timely implementation of the new license process.

We are working with the NRC staff to improve efficiency by examining opportunities for schedule acceleration, and to create schedule certainty. We support the Commission's ongoing independent examination of the license hearing process to identify ways to improve and streamline that process. A similar effort in 2009 was successful in significantly reducing the duration of the certified design rulemaking process and improving schedule predictability – we believe such opportunities also exist for the combined license process.

With respect to the subject of this hearing an examination is provided regarding how the NRC is meeting each of the following five NRC core Principles of Good Regulation in licensing new reactors:

- Independence,
- Openness,
- Efficiency,
- Clarity, and
- Reliability.

Independence:

Nothing but the highest possible standards of ethical performance and professionalism should influence regulation. However, independence does not imply isolation. All available facts and opinions must be sought openly from licensees and other interested members of the public. The many and possibly conflicting public interests involved must be considered. Final decisions must be based on objective, unbiased assessments of all information, and must be documented with reasons explicitly stated.

Regarding the principle of independence, the NRC, under the direction of the Commissioners, has earned the utmost respect for the job they have done. I think the reasons behind this success are best summarized in remarks often made by Chairman Gregory B. Jaczko. The following quotes are taken from his remarks at "The Howard Baker Forum" in Washington, DC on September 24, 2009, and from remarks at "EnergyBiz Leadership Forum" in Washington, DC on March 1, 2010:

[The NRC does] not have a role in deciding how many new nuclear reactors may potentially be built in the United States. Our focus is ensuring public health and safety in the use of nuclear materials. Ensuring that the NRC maintains its focus on safety and security, and continues to be viewed as a firm regulator with the confidence of the public, is important.

... it is not the role of the Nuclear Regulatory Commission (NRC) to promote or discourage the use of nuclear power. The future of nuclear power – whether it expands or contracts – is ultimately one for the public to determine through the actions of the public and private sector, the Administration, and the Congress.

In maintaining this independence, the NRC does an admirable job of fairly taking inputs from the various stakeholders (even conflicting inputs) and making objective and unbiased assessments. There is no recommendation for improvement related to this principle.

Openness:

Nuclear regulation is the public's business, and it must be transacted publicly and candidly. The public must be informed about and have the opportunity to participate in the regulatory processes as required by law. Open channels of communication must be maintained with Congress, other government agencies, licensees, and the public, as well as with the international nuclear community.

Over the last few years, the NRC has received several license applications for the construction and operation of a number of nuclear power plants, nuclear materials facilities, and a geologic repository. These activities have and will continue to generate a great deal of public interest. Overall, the NRC's openness and independence policies have been instrumental to the fundamental shift in the public perception of nuclear power. The professional approach and priority that the NRC gives to these principles is noteworthy.

Specifically with regard to the NRC's new reactor licensing process, there are many opportunities for public participation. Before the NRC receives an application, the agency talks to residents in the community near the location where a proposed new reactor may be built to explain how we review an application and how the public may participate in the process. The NRC listens to comments on what factors should be considered in the agency's environmental review of the application. The public may then comment on the NRC's draft environmental evaluation that is posted to the agency's Web site. In addition, the public is afforded the opportunity to legally challenge a license application through Atomic Safety and Licensing Board hearings that are announced in press releases and posted to the NRC Web site.

As an example of the opportunities for public interaction, the following table lists many of the public meetings on the Calvert Cliffs 3 docket:

Year	Date	Meeting Topic
2010	3Q 2010 (planned)	MDE public meeting - wetlands permit
	5/25/10 (planned)	Joint NRC/USACE public meeting – DEIS comments in Solomons, MD (two sessions afternoon and evening)
	04/19/10	PSC public meeting - Case 9218 in Solomons, MD
	04/19/10	PSC Hearing – Case 9218 in Baltimore
	2/18/10	Public Meeting –Presentation of Final Safety Analysis Report Chapter 8 to the Advisory Committee on Reactor Safeguards (ACRS)
	3/17/10	Public Meeting to discuss NRC requests for additional information in the area of geotechnology
	4/ 20/10	Public Meeting –Presentation of Final Safety Analysis Report Chapters 4, 5, 12, and 17 to the Advisory Committee on Reactor Safeguards
2009	4/17/09	Public Meeting to Discuss Intake Structure Relocation, Geotechnical Issues and Seismic Analysis Issues
	5/8/09	Public Meeting to Discuss the Alternative Siting Process for the Proposed Calvert Cliffs Unit 3
2008	3/9/08	NRC Public Environmental Scoping Meeting
	8/14/08	NRC Public Meeting with AREVA NP, UniStar, and AmerenUE
	10/30/08	Public EPR Design Center Working Group Meeting
	08/19/08	PSC Case 9127 Public Meetings in Solomons, MD
	08/11/08	PCS Case 9127 evidentiary hearings in Solomons, MD

Year	Date	Meeting Topic
	08/11/08	PSC Case 9127 Public Meetings in Solomons, MD
	08/4/08	PSC Case 9127 Public Meetings in Solomons, MD
2007	8/14/07	Public Outreach

In maintaining this level of public transparency and openness, the NRC does an admirable job of outreach to the public. There is no recommendation for improvement related to this principle.

Efficiency:

The American taxpayer, the rate-paying consumer, and licensees are all entitled to the best possible management and administration of regulatory activities. The highest technical and managerial competence is required, and must be a constant agency goal. NRC must establish means to evaluate and continually upgrade its regulatory capabilities. Regulatory activities should be consistent with the degree of risk reduction they achieve. Where several effective alternatives are available, the option which minimizes the use of resources should be adopted. Regulatory decisions should be made without undue delay.

Almost half of the NRC's current workforce has been at the agency for less than five years. In this time, the number of NRC employees has grown by 25 percent, and the size of the budget has grown by more than 50 percent. The renewed interest in nuclear power has substantially increased the licensing and regulatory workload. That reflects the dramatic challenges for the NRC management and administration. This challenge is shared within the private sector as well. This makes it critical that together the NRC and the private sector find ways to be as efficient as possible. Efficiency is a joint endeavor.

The topic of schedules impacts directly on efficiency and on openness. The typical NRC review schedule assumed a standard short duration window (e.g., 30 days) for completing and transmitting a response to an NRC request for additional information. In most cases, the response may require significantly more time and effort. The key to enhancing efficiency is minimizing the delays between handoffs -- more so than meeting an arbitrary pre-defined window. If we and the NRC staff can manage our resources such that questions and answers flow towards a final decision with minimal delay, then we have done all that we can do to be efficient. This is not an easy task, nor can it realistically ever be completely achieved. However, to make any realistic strides, we need to openly and completely share our resource and schedule constraints. I think this is one area where we both could apply some improvements.

Let me first note that the NRC's statement of this principle includes the statement that the NRC's statement of this principle includes the statement that the "NRC must establish means to evaluate and continually upgrade its regulatory capabilities." The recommendation that the NRC establish a "self assessment" evaluation process, whereby the industry feedback could be part of that evaluation

and the NRC's continual upgrade, is consistent with this principle. The industry lessons learned regarding self assessments is discussed in more detail below.

Clarity:

Regulations should be coherent, logical, and practical. There should be a clear nexus between regulations and agency goals and objectives whether explicitly or implicitly stated. Agency positions should be readily understood and easily applied

There are enormous strides the NRC staff has made in upgrading the regulatory guidance in an effort to achieve consistency in submittals and the ensuing review. The NRC staff has continued promulgated continuous Interim Staff Guidance and draft revisions to Regulatory Guides, which reflects the desire to capitalize on lessons learned. This reality reflects on competing concerns. First is the desire to have the regulations reliable and not in a state of transition. Evolving guidance creates opportunity for reviewers to continue to request more or different content for the submittals, which increases uncertainty and extends schedules. Second is the positive aspect of establishing a consistent expectation where perhaps there was not a clear nexus. As discussed in the additional information section, lack of clarity in NRC regulatory expectations have caused problems for the first applicants. However, it is expected that future applicants will benefit from the improvements in regulatory clarity currently being developed.

In this first wave of applications and reviews, the first concern is more evident than desired; and there is an expectation that this will diminish as subsequent applications are reviewed. The resultant reworking of the application to address these changes can and has had impacts on many of the other principles also (like efficiency and reliability).

Reliability:

Regulations should be based on the best available knowledge from research and operational experience. Systems interactions, technological uncertainties, and the diversity of licensees and regulatory activities must all be taken into account so that risks are maintained at an acceptably low level. Once established, regulation should be perceived to be reliable and not unjustifiably in a state of transition. Regulatory actions should always be fully consistent with written regulations and should be promptly, fairly, and decisively administered so as to lend stability to the nuclear operational and planning processes.

Reliability, as related to new nuclear plants, is a central element of the regulatory process. This requires a predictable licensing process for the review and inspection of new reactor designs and new construction. The industry and the financial community must have confidence that the licensing process provides the level of predictability necessary to support large capital investments.

On April 26, 2005, Mike Wallace (who is now Executive Vice President, Constellation Energy Group, Inc.) testified before the United States Senate Committee on Energy & Natural Resources. Mr. Wallace noted the following regarding the challenge of a reliable new reactor licensing process:

... until the process is demonstrated, the industry and the financial community cannot be assured that licensing will proceed in a disciplined manner, without unfounded intervention and

delay. Only the successful licensing and commissioning of several new nuclear plants ... can demonstrate that the licensing issues ... have been adequately resolved.

At that time, there were only two applications being seriously contemplated. Barely five years later, the NRC has received 18 combined operating license applications (COLA) for a total of 26 new nuclear units. That speaks for itself in support of the fact that the NRC and Industry have been working systematically through the licensing process to ensure that application development and review will be as efficient and consistent as possible. The industry has sufficient confidence in the process to invest to the degree it has in the pursuit of licensing new reactors. A couple of key developments evolved over this period:

- Agreement to a process that takes advantage to the extent practical of implementing a design-centered approach to facilitate review of multiple standardized COLAs in parallel based on the use of "one issue, one review, one position."
- Guidance documents, both from the Industry working through NEI and from the NRC in revisions to Regulatory Guides and Standard Review Plans, for implementing 10 CFR Part 52.

Overall, the progress that has been made to reduce the review schedules, increasing efficiency and effectiveness of the available man-power, and reduce uncertainty and financial risk has been a huge success for us all to be proud of. However, we have not yet achieved the goal of "*the successful licensing and commissioning of several new nuclear plants.*"

Just as it was five years ago, the unknown risks associated with the remaining untried steps in the process represent an uncertainty that demands continuing focus on improvement. The significant headway and associated reduction in uncertainty must be applied to the remaining steps leading to commercial operations of the fleet of new reactors. The overall aim should be to reduce the licensing burden without affecting the quality, scope or the thoroughness of the review.

Specific challenges ahead where we need to focus our attentions to continue to identify the risks and appropriately contain them, or in some cases define the risk, are in the areas of

- Mandatory Public Hearing

The mandatory hearing at the end of the COL process is required by the Atomic Energy Act, even in the absence of a successful intervention by a party opposing a license. Unknowns in scheduling the hearing window could reflect between 15% and 35% of the entire COLA review and approval duration. It is critical for this process to become much more reliable and stable. There are multiple opportunities for public involvement that are now a standard part of the staff's review of the licensing application and the environmental impact statement. There is also the detailed review that is undertaken by the independent experts on the Advisory Committee on Reactor Safeguards that also affords public awareness and interaction. As a result, the Commission is considering a legislative-style hearing to ascertain the sufficiency of

the licensing review. Rather than limiting public involvement, a legislative-style hearing might allow appropriate and efficient wide-scale scrutiny to supplement the other opportunities for public involvement. Chairman Jaczko at the NRC Regulatory Information Conference in Rockville, MD on March 9, 2010 acknowledged that it is incumbent on the Commission to lay out a vision on how these hearings will look and concrete, transparent plans about how they will be conducted.

- NRC Review Schedule

Certainty in scheduling is even more crucial than speed when planning for multi-billion dollar projects. Nonetheless, although the Part 52 process largely serves to move regulatory decisions as early in the process as they can reasonably be made, and while this is noteworthy, given the overall length of the license process, there often are significant expenditures that must be incurred for long-lead-time components before the licensing process has been completed. With hundreds of millions of dollars at stake, even a small delay can have a significant adverse financial impact. Therefore, efforts should be made to avoid unnecessary delays and where unavoidable, anticipate them as early in the process as possible.

Additional Discussion Topics:

Environmental Report Challenges: Initially, the NRC safety and environmental branches had different approaches to the process for NRC requests for additional information (RAI). In the safety RAI process the applicant has a ten day period to review and if necessary obtain clarification (from the NRC) of RAIs before they are formally submitted. In the case of environmental RAIs, the NRC's environmental group would forward final RAIs without any pre-screening or ability for clarification but with the same expectation of receiving responses within a 30 day period. It should be noted that based on discussions with UniStar the NRC recognized the discrepancy between the two branches in the processing of RAIs.

Without the benefit of preliminary discussions, the applicant would be required to initially bin the questions into the appropriate discipline areas (socioeconomics, hydrology, ecologies etc), provide the RAIs to the subject matter experts for review and determination of clarity and effort required to respond, discuss any clarifications with the NRC, develop the response, conduct applicants review of the response and forward to the NRC. Needless to say, this would be challenging with just a handful of RAIs.

However, the initial environmental RAIs were submitted in what can be described as batch mode. Specifically, UniStar received 358 environmental RAIs on May 13, 2008. Many of the environmental RAIs consisted of multiple questions.

Of these 358 environmental RAIs, the UniStar team managed to respond to 299 within the expected 30 day period. By the end of 2008, UniStar had responded to nearly 400 environmental RAIs issued that year. Subsequent submittals included a batch of 71 and a batch of 23 environmental RAIs.

In recognition of the improved process on the safety side of RAIs, the last set of RAIs issued in 2009 were pre-screened in a similar manner as is done with safety RAIs, albeit only seven days in advance of the formal submittal of the RAIs. This did however facilitate a quicker turnaround allowing UniStar to respond within 7 days thus imposing less impact on the schedule.

By the end of 2009 when the NRC began their final writing session for the draft EIS (DEIS) for Calvert Cliffs 3, a total of 474 environmental RAIs had been issued by the NRC and responded to by UniStar (see Figure 1 below). During the above described 1½ year period UniStar was not aware of a formal closure process in which the NRC would acknowledge that a particular RAI response was complete and sufficient. More than one and a half years after the majority of RAI responses were provided, UniStar was informed that there would be no more RAIs issued and that the NRC was starting their final writing session for the DEIS. By default, UniStar assumed that the responses to the 474 RAIs were complete and sufficient.

The Calvert Cliffs 3 DEIS was originally scheduled to be issued in February 2008. However it was ultimately issued 14 months later. A major contributing factor to this delay was the alternative site screening and evaluation process. While Part 3, "Environmental Report", of the Calvert Cliffs 3 COLA was submitted in July 2007, the NRC only informed UniStar of an issue with the alternative site process described therein, Section 9.3, in early 2009. The issue stemmed from new NRC guidelines based on NRC's Atomic Safety and Licensing Board (ASLB) experience with the North Anna's ESP alternative site evaluation (ASLB's Memorandum and Order was issued November 27, 2007) and clarification of vague language of the same guidelines.

This led to a public meeting (NRC & UniStar) in May 2009 where NRC identified gaps in UniStar alternative site process that did not meet NRC unpublished (a Revision to NUREG-1555 is in process) expectations/interpretation guidelines. It should be noted that this was a generic issue affecting all COLAs (Calvert Cliffs 3, South Texas Project, Luminant, et al). As a result, UniStar quickly and efficiently reconstituted the entire alternative site approach that in final analysis met NRC needs/requirements.

The NRC worked very closely with UniStar during the reconstitution period, at times on a daily basis, to ensure that their expectations of requirements continue to be met. It is recognized that this open communication was a key factor in facilitating the reconstitution process in a timely manner recognizing that maintaining overall schedule was an important factor in the process.

The reconstitution process which consisted of development of a comprehensive site selection process and update of Section 9.3 of the Calvert Cliffs 3 Environmental Report did however take several weeks and along with additional site walkdowns, an environmental audit of proposed alternative sites, and the issuance of 23 additional RAIs (discussed above). As a result, the DEIS issuance was impacted by an additional 11 months. The Calvert Cliffs 3 DEIS was issued on April 16, 2010, approximately 14 months after the initially scheduled date, which closed Phase II of the four phase COLA environmental review process.

The next two phases of the COLA environmental review process involve a 75 day public comment period which closes July 9, 2010, resolution of comments and final update of the Calvert Cliffs 3 EIS. Unless additional RAIs are issued by the NRC to UniStar, these last two phases should not involve or be contingent on any UniStar input or interaction.

The NRC's generic schedule for the last two phases has typically been 12 months. The NRC has been sensitive to the finality of this process and believes that even with the last unanticipated DEIS delay of six weeks they can still finish and issue the FEIS by February 2011. UniStar believes that the NRC has room for improving the schedule if little or no change to the DEIS is required to make it into an FEIS. It should be noted that other agencies such as FERC have managed to turnaround this process (DEIS to FEIS) within 6 months on numerous large projects^{1,2,3}. In addition, FERC has completed the DEIS to FEIS turnaround with the US Army Corps of Engineers (USACE) as a cooperating agency in as little as 4-5 months^{4,5}.

Not unlike the NRC, UniStar is processing multiple COLAs with a finite resource pool. Planning and scheduling are critical to managing resources and maintaining efficiency. It is critical for UniStar, or for that matter any applicant, to have critical insight into content and timing of the NRC's RAIs as well as the issue of the DEIS and more importantly the FEIS.

The latter is not only a critical element of the NRC's licensing process but a critical element for the NRC's contributing agency, the USACE, and the Maryland Department of Environment (MDE). Both USACE and MDE are relying on the Calvert Cliffs 3 FEIS as the basis for their processing of wetlands permits. The issue of the wetlands permits is a critical construction milestone for the Calvert Cliffs 3 project as it triggers the mobilization of a large construction workforce that will implement the resource-intensive initial site grading process. Accordingly, opportunities exist to improve efficiency and clarity in this area.

¹ Ruby Pipeline Project (Docket No. CP09-54-000). The draft EIS was filed with the U.S. Environmental Protection Agency (EPA) and a formal notice of availability was issued in the Federal Register on June 26, 2009. The final was issued January 8, 2010. The Federal Register notice established a 45-day comment period on the draft EIS that ended on August 10, 2009.

² Dominion Cove Point Expansion Project (Docket Nos. CP05-310-000 et al.). FERC issued the draft EIS and a notice of availability on October 28, 2005 and filed it with the EPA. FEIS issued April 28, 2006. A formal notice indicating that the draft EIS was available was also published in the Federal Register, and the document was mailed to approximately 1,550 individuals and organizations on the mailing list prepared for the project. In accordance with the Council on Environmental Quality (CEQ) regulations implementing NEPA, the public had the opportunity to comment on the draft EIS in the form of written comments up through December 21, 2005 (53 day comment period).

³ Catawba-Wateree Hydroelectric Project (Project No. 2232-522). The draft EIS was issued March 9, 2009. Final Environmental Impact Statement issued: July 23, 2009. Public meetings were held on April 21 and 22, 2009.

⁴ Floridian Natural Gas Storage Project (DEIS 3/21/08 – FEIS 7/22/08) -- 4 months

⁵ Rockies Express East Project (DEIS 11/23/07 – FEIS 4/21/08) -- 5 months

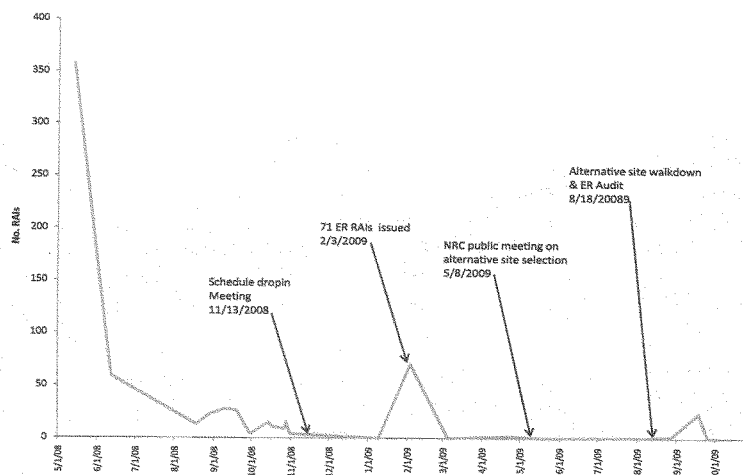
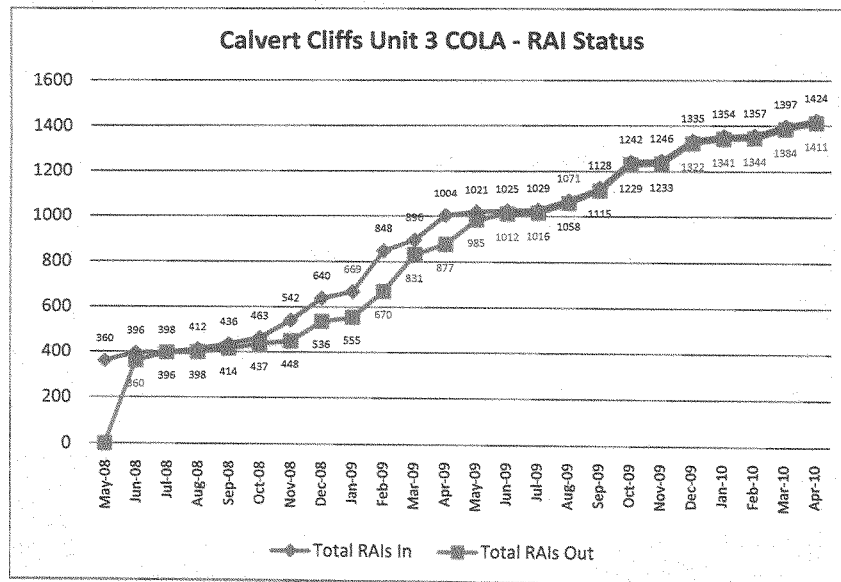
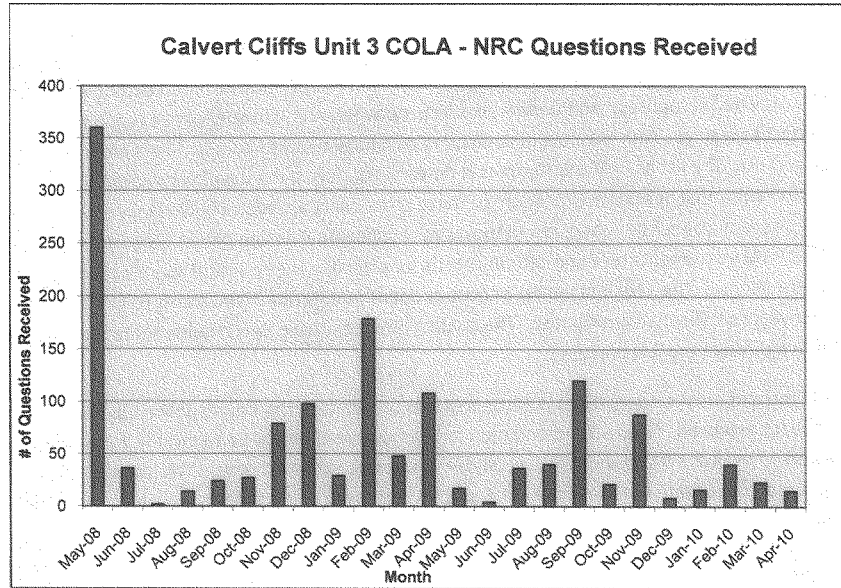


Figure 1 - Calvert Cliffs Unit 3 Environmental RAI Workoff Summary

Request for Additional Information (RAI) Process: When the NRC issues an RAI, either the response or a schedule for providing the response to the RAI is due within 30 days. The 30 day response time was jointly developed between the NRC and the Nuclear Industry and is one of the assumptions used in the development of the COLA schedule. Using this time frame, NRC resources can be scheduled based on the anticipated response time. Thus, delays in providing responses can have adverse effects on the review schedule. While some responses can be provided quickly, experience has shown that response to any given RAI set requires an average of 75 days. Thus, a review schedule based on a 30 day response would not be realistic and would require continuous re-evaluation. A more realistic default response time may help to reduce the scheduling impacts in the future.

It is natural for reviewers to have questions as they review the different sections of the license application. These questions are transmitted to the applicant as RAIs. From a resource scheduling standpoint, this presents a problem since there is currently no indication that an RAI is being issued until it arrives. Consequently, the applicants maintain resources that are ready to respond to the RAIs. In general, each RAI set averages approximately four questions. As discussed above, over 300 questions were transmitted at one time. This required a large diversion of resources and a rush to obtain external vendor support to address these questions. The following tabular depiction of RAIs per month and graphical depiction of total RAIs received and responded to over time demonstrate this issue:



Another factor affecting the timeliness of applicant responses to RAIs is regulatory guidance. The level of detail the NRC reviewers expected to be included in the COLA was not completely understood by the applicants. In some cases, NRC staff RAIs requesting additional information required extensive work to develop and provided responses. Additionally, conflicts between regulatory guidance required extensive effort to resolve. One example of conflicting guidance involved post-accident monitoring (PAM) instruments. The list of PAM instruments is determined during the development of the emergency and abnormal operation procedures. These procedures are typically developed just prior to fuel load (i.e., several years from now); not in the current conceptual design phase. Regulatory guidance specifies that PAM instruments meeting certain criteria be placed in the technical specifications prior to issuance of the license. This requires the list of post-accident monitoring instruments to be developed three to four years earlier than anticipated. The conflict between these two requirements took over a year to resolve through the RAI process.

Once an RAI response is provided, there is no clear status on whether the RAI response has been reviewed and/or accepted. One recommendation for improvement would be to include a timeframe for NRC reviewers to evaluate RAI responses (i.e., review responses within 60 days). This transparency in the schedule would facilitate the availability of applicant resources and promote a more timely response to NRC follow-up questions should the initial RAI response need additional clarification.

Self Assessment Process: Self-assessment is essentially a critical comparison of existing activities and results against a predetermined set of performance expectations. Self-assessments can help to identify and overcome weaknesses and obstacles to the achievement of performance objectives. The Nuclear Industry has successfully used self-assessment as a method for evaluating and improving performance in many areas. The Nuclear Industry also relies on external assessments to confirm the results of the self-assessments and to ensure that objectivity is maintained.

The self-assessment process, in conjunction with other forms of external assessments, is a major factor in reaching the desired overall performance expectations. A strong commitment to the self-assessment process can motivate individuals to seek improvements in performance and to develop a greater sense of ownership in existing processes. The full set of performance expectations can be the set of goals, targets and objectives, including those set by the organization management, that are to be followed and achieved by the staff as a whole. The NRC's Principles of Good Regulation establish the principles used to ensure safety and security while appropriately balancing the interests of the NRC's stakeholders. These Principles of Good Regulation are focused primarily on how the NRC interfaces with the public, licensees, and applicants, which are all external groups. Without input from those external groups, the assessment cannot be considered objective or complete.

The NRC does solicit information from external sources such as through surveys in order to improve its programs and processes. The self-assessment process associated with the conformance to the Principles of Good Regulation could also benefit from external input, such as from the public, licensees and applicants. Such improvements would be in accordance with the principle of efficiency. Posting the results and making the self-assessments publicly available for comment would be in accordance with the

principle of openness. The benefits of this approach could be applied when evaluating the performance of the Office of Nuclear Reactor Regulation, the Office of New Reactors; and Regional Offices – Inspection and Enforcement.

Given the rate at which the new reactor licensing process is moving forward, a more frequent self-assessment may be warranted, but I would like to offer the suggestion that the NRC seek stakeholder feedback on how it is complying with its principles at least on an annual basis. A more frequent self-assessment in the near term may help to identify potential areas of improvement on a timelier basis. The goal would be to ensure a stable and predictable regulatory process for the licensing and construction of new reactors.

In closing, I would thank the Committee. We have an opportunity, as a nation, to create jobs, stimulate the economy, rebuild the domestic manufacturing infrastructure, and curb greenhouse gases with nuclear energy – a clean, reliable, base load energy source. As a new plant license applicant, I am encouraged by the high-level of commitment demonstrated by the NRC staff to act in a fair and consistent manner. The industry hopes and expects that rigorously applying the lessons learned in the first round of applications will make the processing of subsequent applications more efficient.



Marvin S. Fertel
PRESIDENT AND CHIEF EXECUTIVE OFFICER

May 19, 2010

The Honorable Barbara Boxer
Chairman
Committee on Environment and Public Works
410 Dirksen Senate Office Building
Washington, DC 20510-6175

The Honorable James M. Inhofe
Ranking Member
Committee on Environment and Public Works
456 Dirksen Senate Office Building
Washington, DC 20510-6175

Dear Chairman Boxer and Ranking Member Inhofe:

I write to clarify and supplement some statements made by industry representatives on new nuclear plant procurement activities during the May 5, 2010, Senate Environment and Public Works Subcommittee Hearing and to provide additional information on these activities.

First, I would like to thank you for your continuing leadership in providing oversight of the Nuclear Regulatory Commission in a manner that assures that the agency's actions, processes and regulations are consistent with the commission's Principles of Good Regulation: independence, openness, efficiency, clarity and reliability. A strong, credible and transparent regulator is essential for America's nuclear energy future.

If the nation is to meet its climate change goals, America must invest in all forms of low-carbon electric generating capacity. The Electric Power Research Institute estimates that at least 45 nuclear plants must be brought into operation over the next 20 years with others under construction, as part of a portfolio of technologies to meet U.S. electricity demand while reducing atmospheric emissions from the electric sector.

To support this deployment of new nuclear plants, America must expand its domestic production of high-quality components and materials. The amount of material and equipment will vary according to reactor design; however, the following information represents the scale of supply that will be required. Each nuclear plant will require: more than 600 nuclear grade pumps and valves; as much as 400,000 feet of small bore piping and at least four miles of specialty piping of all sizes; more than 200 miles of cabling; and a minimum of 92,000 tons of structural and reinforcing steel, with some design estimates as high as 300,000 tons.

Now is the time for additional federal policy initiatives to strengthen the U.S. manufacturing industry, lay the foundations for increased, state-of-the-art U.S. manufacturing capability and create

Chairman Boxer and Ranking Member Inhofe
 May 19, 2010
 Page 2

tens of thousands of U.S. jobs. American manufacturers will not provide some specialized components for the first new U.S. reactor projects because the components, such as large forgings and heat exchanger components are not manufactured currently in this country or the component cannot be delivered to the precise quality and schedule requirements. Yet, additional incentives will enable U.S. industry to expand and secure valuable export orders, creating new jobs in the U.S. while also ensuring that U.S. industry, not foreign manufacturers, are in a position to supply the equipment, material and services for the growth in new U.S. reactor construction rates in the later part of the decade.

While, as stated above, U.S. generating companies have to buy specific components from overseas manufacturers for the first wave of new U.S. nuclear plants, the recent statements that the U.S. nuclear industry buys or plans to buy most of its equipment from overseas suppliers are incorrect. The majority of components, materials and services for the nuclear industry are procured from U.S. facilities. In 2008, companies that operate 104 U.S. reactors and two nuclear energy vendors procured more than \$14 billion in goods and services from approximately 22,500 companies and manufacturing facilities located in all 50 states.

For new nuclear energy facilities, NEI gathered the following procurement information from the lead U.S. projects:

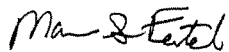
- Three of the lead projects will obtain between 60 percent and 80 percent of components, commodities and services from U.S. manufacturing facilities.
- For three of the five lead plants, more than \$2 billion in equipment and services has already been ordered from U.S. manufacturers in 17 states.
- Three of the five design-centered reactor project teams have set U.S. procurement and labor goals of between 75 percent and 90 percent, and they are on target to achieve those goals. For these projects, the potential value of the orders for commodities, components and services from U.S. manufacturers and suppliers over the next five years is more than \$30 billion.

U.S. companies and workers also are benefiting from the worldwide expansion of nuclear energy. American companies have booked export orders for more than \$2.5 billion in equipment and services, including generators, reactor coolant pumps and instrumentation and control systems. U.S. workers in 25 states – including Illinois, Ohio, Pennsylvania, South Carolina, Virginia, and Tennessee – are beginning to reap the benefits of reinvestment in the U.S. nuclear supply chain. This is just the start of the growth expected in this sector. Expanded manufacturing incentives would accelerate the expansion of U.S. manufacturing and the creation of jobs, just as tax incentives did in Louisiana and Tennessee. The Department of Commerce estimates, as a general rule, that every \$1 billion in exports by U.S. manufacturers creates approximately 5,000 jobs in the United States.

Chairman Boxer and Ranking Member Inhofe
May 19, 2010
Page 3

I trust this letter clarifies and expands some of the topics that were discussed in the May 5th hearing. Thank you once again for your leadership and for your oversight of the Nuclear Regulatory Commission. If you have any questions on the nuclear energy supply chain, please contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Marvin S. Fertel". The signature is fluid and cursive, with the first name "Marvin" and last name "Fertel" clearly distinguishable.

Marvin S. Fertel

cc: The Honorable Max Baucus
The Honorable Benjamin Cardin
The Honorable Bernard Sanders
The Honorable Jeff Merkley
The Honorable George Voinovich
The Honorable Christopher S. Bond

Environment and Public Works Committee Hearing
May 5, 2010
Follow-Up Questions for Written Submission

Questions for George Vanderheyden

Questions from:

Senator Thomas R. Carper

1. A question about U.S. manufacturing capability. We understand that U.S. generating companies have to buy many components from overseas manufacturers for the first wave of new U.S. nuclear plants. Do you know if the U.S. nuclear industry buys or plans to buy most of its equipment from overseas suppliers? Or are the majority of components, materials and services for the nuclear industry procured from U.S. facilities? What policy initiatives are needed to strengthen the U.S. nuclear manufacturing industry and build more American jobs?

A: Please find enclosed a letter to the Committee on Environment and Public Works from the Nuclear Energy Institute (NEI) which addresses the nuclear industry's approach to the domestic supply chain.

UniStar Nuclear Energy plans to procure the majority of components, materials and services from facilities in the United States. However, a limited number of the proposed Calvert Cliffs 3 project's critical components will be supplied from overseas, such as, the Reactor Coolant System (RCS) heavy components, portions of the steam turbine generator, and some Digital Control System subcomponents.

UniStar and its partners are making strategic investments in the future of nuclear energy—and those investments will translate into manufacturing opportunities across the country. In June 2008, our partner, Alstom, a leading turbine-generator supplier for nuclear energy facilities, announced it was investing an additional \$200 million into its facility in Chattanooga, Tennessee. This investment will also create 350 new jobs, including administrative, design engineering, and highly skilled, specialized manufacturing positions.

AREVA, our nuclear technology provider, announced plans to open new facilities in Idaho and Virginia and expand existing facilities in Virginia and North Carolina. In Virginia, AREVA and Northrop Grumman are building a \$363 million manufacturing facility in Newport News that will make major equipment for nuclear reactors in the U.S. and for export overseas. The plant will employ more than 540 people.

AREVA's proposed Eagle Rock Enrichment Facility in Idaho is approximately a \$3 billion, state-of-the-art facility that will supply enriched uranium to fuel America's fleet of nuclear reactors. The facility will employ hundreds and create additional jobs across the country through its own supply chain.

In terms of policy initiatives, the nuclear industry would benefit from a federal policy related to carbon prices. UniStar Nuclear Energy believes that nuclear energy will emerge as the most viable source of baseload-energy generation in a carbon-constrained marketplace. Nuclear energy is a proven technology that provides electricity around the clock, while producing no greenhouse gases. As policy changes increase the costs of generating sources that emit greenhouse gases, nuclear energy will become an increasingly attractive way to power our economy.

Senator James M. Inhofe

1. I understand UniStar is planning to build a new reactor at the Calvert Cliffs site in Maryland and that you are actively preparing the site for construction after you receive your license. I also understand the NRC has not indicated when they expect to issue it. Would you please describe for the committee the challenges that this uncertainty creates for your project? In particular, how does this uncertainty affect your ability to attract financing?

A: This uncertainty ultimately affects our ability to close on U.S. Department of Energy (DOE) loan guarantee financing and thereby effectively hedge our interest rate exposure. The unspecified timeline undermines our ability to maintain a seamless process to full construction due to the variability that is introduced in our pre-construction activities. In addition, this uncertainty will hinder our efforts to efficiently plan the procurement and purchasing of construction materials. Our engineering, procurement, and construction (EPC) contractor's ability to retain skilled labor and ultimately mobilize a peak construction labor force of 4,000 people is also impacted. Without the accurate planning of full construction, the project's economic value will be negatively affected.

This uncertainty affects financing opportunities because potential investors are concerned that new nuclear energy facilities could face political and regulatory risks. Although the federal government has created a more efficient and predictable licensing process, which should reduce licensing risk, investors remain concerned given the high cost and long development times for nuclear energy facilities. The industry can build investor confidence by ensuring that licensing and construction of advanced reactor designs is completed on schedule and within budget. Therefore, all projects would benefit from a more defined timeline. However, since the licensing risk is a function of the federal government's regulatory process, only the federal government can offset that risk.

2. How much have you invested in the project so far and how much do you anticipate investing prior to receiving your license? What would be the cost impact of a one month delay in COL issuance? Six months?

A: The total UniStar investment to date is approximately \$650 million and the total UniStar investment prior to receiving our combined license could be approximately \$2.8 billion. The impact of a one month delay is approximately \$79 million, and the impact of a six month delay is approximately \$472 million. The delay costs reflect higher engineering, procurement and construction costs, higher owner's costs, and financing costs. It is important to note that this

analysis does not include any lost profit that would be forfeited as a result of a delay. As a result of the schedule uncertainty highlighted in an earlier question, we are making every attempt to lower our pre-combined license expenditures below what is optimal for the project.

3. You have highlighted the need to focus on improving efficiency in the open item closure process; that is reaching closure on Request for Additional Information process. You also indicate the need for proper use of schedules to achieve the appropriate efficiency. Could you explain more about the current inefficiencies and the role of schedules in improving certainty in the review process?

A: The NRC staff has been diligent in executing their processes for reviewing and requesting additional information (RAIs) from applicants. However, two potential improvements can be made to these processes.

First, once the NRC has asked an applicant an RAI question, the applicant provides a response date to the NRC staff if the question cannot be answered within 30 days (default period). Establishing the appropriate response date for RAIs that extend beyond 30 days is difficult, because the applicant does not have the detailed schedule information on when the NRC reviewers will be available. If an NRC reviewer is not available, providing an expedited response is of no value because the NRC staff will not be available to review it. Similarly, if an NRC reviewer is only available for a specific window, if the applicant does not know this – the window of availability can easily be missed.

Therefore, applicants could improve efficiency by having the detailed resource loaded NRC review schedule available to establish the applicant's priority for multiple RAIs being worked simultaneously. UniStar has had as many as 180 RAI questions in process simultaneously. As such, applicants have to contact the NRC staff repetitively to ascertain NRC resource availability – this is inefficient and many times ineffective.

Second, after having submitted the RAI response to the NRC staff, it is not clear whether the RAI response was acceptable. Many times the review of the RAI response does not even begin until the NRC has scheduled the writing session for the safety evaluation report (SER) with Open Items. At this point, months (even up to a year) may have transpired since the RAI was submitted. If the NRC staff has additional questions months after the RAI was submitted, applicants may not still have those resources available – indeed, personnel who prepared the response may have even left the project or been reassigned to other projects.

Our experience has been that NRC staff review of the UniStar RAI responses has often been delayed for many months. For example, eleven RAI questions were issued for COLA Final Safety Analysis Report (FSAR) Chapter 6, Engineered Safety Features. The final response to these eleven questions was submitted in November 2009; however, based on the RAI review status provided by the NRC, as of June 1, 2010, only three of the eleven responses have been reviewed and dispositioned. Similarly, 16 RAI questions were issued for FSAR Chapter 16, Technical Specifications, with the last of these responded to in December 2009; however, as of June 1, 2010, none of these RAI questions have been reviewed and dispositioned.

Therefore, the NRC could improve the process by including a “feedback” milestone within 30 to 60 days after receipt of the applicants’ response in the NRC review schedule for each RAI response. “Feedback” would improve the communication with applicants on whether the response was acceptable or needed additional information.

In summary, process improvements in providing more detailed schedule information and feedback on RAI acceptability, would benefit both the NRC staff (who are diligently working the current process) and the applicants. UniStar may be missing opportunities to reprioritize certain RAIs to support near-term NRC review windows in other specific subject areas. Knowledge of the NRC resource availability would also allow UniStar to address NRC review constraints that have negative schedule impacts to the Project.

4. Do you have any additional suggestions on areas in which the NRC could be more efficient? Please be specific and include examples.

A:

Initial RAI Issuance

The NRC staff works well to review the application and issue requests for additional information (RAIs) in a timely manner. However, the NRC process does not currently communicate efficiently the schedule for receipt of those RAIs by the applicant. Therefore, planning our resources to address those RAIs is not efficiently managed. For example, in August 2009 UniStar received 20 RAI questions related to the design of safety-related Category I structures and foundations. Preparation of the response to these questions involved the engagement of a highly specialized and experienced team of experts.

Prior knowledge of the numbers of questions being drafted, and approximate target dates of NRC issuance of the RAIs, would have improved the efficiency and shortened the time needed to respond by facilitating scheduling and coordination of these resources. A similar situation occurred in November 2009 when UniStar received 85 RAI questions related to the security plan with very limited advanced warning.

Therefore, if the NRC process could provide advanced warning 90 days in advance of the anticipated dates for issuance of RAIs and to the extent possible the numbers of RAIs being drafted, applicants could more efficiently anticipate and prepare the resources necessary to develop the responses.

Prioritizing Docket and ACRS Review

Clearly the NRC staff has a significant challenge in accommodating review of all the applications (COLA as well as Design Certifications). UniStar appreciates that prioritizing limited resources must be done. UniStar appreciates that as a DOE Loan Guarantee plant, that Vogtle should receive proper priority. UniStar also recognizes that the AP-1000 is a certified design; however, we note a very high NRC priority on AP-1000 issues and amendment(s) reviews.

The NRC has acknowledged at recent meetings with UniStar that they have given resource priority to the AP1000 and Vogtle COLA, and this has caused delays in the U.S. EPR and UniStar Calvert Cliffs review.

Similarly, the NRC review process includes requisite presentations to the Advisory Committee on Reactor Safeguards (ACRS). Scheduling of the limited available times that the ACRS subcommittee meets and assignment of these available times to the various applicants is contingent upon NRC staff completion of the "SER with Open Items." If the NRC staff delays the U.S. EPR and Calvert Cliffs review due to resource priority and focuses on the AP1000 issues, the ACRS schedule also slips. This has been the case in the Civil-Structural "critical path" for both the U.S. EPR and the Calvert Cliffs COLA, and the Chapter 3 schedules for both are indeterminate at this point and will likely extend into 2011.

One example of the impact of this prioritization and limited resources is the UniStar submittal of the final Chapter 2 information requested by the NRC staff on October 9, 2009. UniStar met that commitment date, which was made in a letter to the NRC dated May 15, 2009. At that time, UniStar requested the requisite NRC audit be conducted expeditiously in November 2009. The audit was conducted March 16-17, 2010. Currently, completion of Chapter 2 RAI reviews and issuance of the SER with Open Items for this Chapter is scheduled for January 11, 2011.

As another example, UniStar Calvert Cliffs COLA FSAR Chapter 16 has had no RAIs since December 2009. The ACRS presentation for the U.S. EPR was on April 6, 2010. The ACRS presentation for Calvert Cliffs was scheduled for June 25, 2010. UniStar was notified by the NRC staff that this date had slipped to a July 2010 date. However, recent communication provided a tentative ACRS date for this Chapter that has slipped to November 2010 – almost a year after UniStar has answered all RAIs.

UniStar believes the NRC staff is working hard and diligently to the priority established. UniStar supports NRC efforts to increase resources, especially in the Geotechnical and Civil/Structural area which are needed to support applicants and avoid ongoing delays.

COL Hearings

The mandatory hearing at the end of the COL process is required by the Atomic Energy Act, even in the absence of a successful intervention by a party opposing a license. Chairman Jaczko spoke to this in his remarks to the subcommittee, stating that the Commission is committed to conducting the mandatory hearings, rather than to continue to have the Atomic Safety and Licensing Board Panels perform this function. He acknowledged that it is incumbent on the Commission to lay out a vision on how these hearings will look and concrete, transparent plans about how they will be conducted. UniStar supports this effort and are encouraged by the efforts to improve efficiencies.

Time Between DEIS to FEIS

The NRC's generic schedule for the last two phases of the COLA environmental review process has typically been 12 months. The NRC staff have been sensitive to the finality of this process and believes that even with the last unanticipated DEIS delay of six weeks they can still finish and issue the Calvert Cliffs FEIS by February 2011. UniStar notes that the National

Environmental Policy Act (NEPA) process by other Federal agencies, such as the U.S. Army Corps of Engineers, may have similar scope -- yet be able to process the DEIS to FEIS period in a shorter duration.

It may be possible that the NRC processes could be improved if little or no change to the DEIS is required to make it into an FEIS. Evaluating how other Federal agencies perform similar processes may be useful in identifying lessons learned for either agency. Agencies such as FERC have managed to turnaround this process within 6 months on numerous large projects. In addition, FERC has completed the DEIS to FEIS turnaround with the US Army Corps of Engineers (USACE) as a cooperating agency in as little as 4-5 months.

5. How will a new nuclear energy facility contribute to state and local economies (including job creation, taxes, etc.)?

A: According to the Nuclear Energy Institute (NEI), each year, the average nuclear energy facility generates approximately \$430 million in sales of goods and services (economic output) in the local community and nearly \$40 million in total labor income. These figures include both direct and secondary effects. The direct effects reflect the facility's expenditures for goods, services and labor. The secondary effects include subsequent spending attributable to the presence of the facility and its employees as plant expenditures filter through the local economy (e.g., restaurants and shops buying goods and hiring employees).

Analysis shows that every dollar spent by the average nuclear energy facility results in the creation of \$1.07 in the local community.

The average nuclear energy facility generates total state and local tax revenue of almost \$20 million each year. These tax dollars benefit schools, roads, and other state and local infrastructure. It also generates federal tax payments of approximately \$75 million each year.

Building the proposed Calvert Cliffs 3 in southern Maryland would create approximately 4,000 jobs during the peak construction period and approximately 400 permanent, new jobs after completion.

In 2009 hearings before the Maryland Public Service Commission (PSC), independent experts hired by the PSC staff testified regarding the possible effects on BGE ratepayers of building a third nuclear unit at Calvert Cliffs Nuclear Power Plant in Lusby, Md. Looking only at reduced electricity costs to the consumer, these experts concluded that, over the first eight years of Calvert Cliffs 3's operation, BGE customers would save an average of \$141 million annually by purchasing electricity from a new Calvert Cliffs 3.

Senator George V. Voinovich

1. I appreciate your in-depth comments on NRC and industry performance, and agree that all parties should have a self-assessment and improvement process. You point out in your testimony several suggestions for improvements. It seems like both industry and

NRC are communicating on these ideas, and there is apparently ongoing improvement. However, it strikes me that having a final self-assessment while the process is still evolving could have the unintended consequence of diverting NRC and industry focus. Even if this is true, this idea may be beneficial in the future. "Could you please comment on this perspective on the timing of a final self-assessment?"

A: UniStar agrees that care must be taken when performing a self-assessment, not to divert resources and create unintended consequences. However, a self-assessment "while the process is evolving" is also a valuable period to witness inefficiencies and to implement process improvements. Further, the "window of opportunity" to identify and effect process improvements which can benefit the current COLA review schedules is primarily during the next 12 to 18 months. After mid-2011, most applicants will be substantially through the current NRC review processes discussed above.

It is recommended that targeted self-assessments (e.g., Mandatory Hearing Process, setting review priorities, staffing, etc.) should be initiated as soon as practicable.

2. You point out that NRC currently does not have a transparent schedule or method to respond to industry submittals in responses to NRC questions. Could you please provide some specific suggestions on what you'd like to see NRC do to enhance its processes?

A: The NRC review schedule that is made available to applicants is considered by practitioners to be a "Level 2 schedule." At this level, it provides broad windows for when review activities for each application Chapter or Section may be performed, but this schedule information is not at a level of detail that allows the applicant to identify when NRC resources for these review activities are actually scheduled and when work will actually be performed. As previously discussed, this situation results in inefficiencies in the review process because it does not support scheduling and targeting of applicant resources in a manner that would support coordination of RAI response schedules with the availability of NRC review resources.

Senator CARPER. Good. Thank you for that overview.

What I am going to do here initially is just to ask each of you to take a minute or two and to react to some of what you heard your colleagues on this panel say. You could just say, well, that is interesting, or you could say, well, I don't agree with that. Or maybe you do or not. But I would just like to hear your reaction to some of the comments that your colleagues have made on this panel.

Mr. MESERVE. I would be very happy to react. I think that actually when one steps back, that the testimony you heard was really very consistent among all of the witnesses. I fully agree with Mr. Bradford's comments that the slow-down in the process of proceeding with the licenses is not because of regulatory concern. In this financial climate, it is very difficult to finance nuclear power plants.

I also agree that it is essential, as he has emphasized, to make sure that the safety concerns are not only evaluated in the licensing process but are ones that are demonstrated to be evaluated in the licensing process.

I think that there is a great complexity that has been confronted by the NRC in dealing with the fact that they were operating at the same time with the certified design applications being processed as the same time they were trying to process the combined operating licenses. There is an interplay between the two that had not been anticipated. That has created grave complications for interveners. It has created complications for the applicants as well to try to sort things out.

I think the important thing going forward is to make sure, as I think all of us have emphasized with regard to the new reactors, that the process is one in which one learns from the current experience, gets efficiencies into the process, while still maintaining the thorough evaluation which the public is entitled to and expects.

Senator CARPER. Thanks.

Dr. Bradford, would you just react to some of the comments of your colleagues, please?

Mr. BRADFORD. Let me pick up perhaps on the quest for predictability because in the two and a half decades I spent actually regulating, I think I always heard that the process needed to be more predictable.

But it is important to understand that predictability is something of a two-way street. It does depend very heavily on the quality of the initial applications and also the quality of the response to the regulators' questions. It can't just be a matter of the legislative body establishing firmer deadlines and firmer oversight of the Regulatory Commission. There has to be a firm basis for the regulatory agency to go forward.

My understanding, just as an observer, is that the NRC has had problems with some of the applications, both for combined operating licenses and for generic designs in terms both of the adequacy of the application and the adequacy of the response.

It will be important to factor that in in terms of an embrace of a goal of predictability. You just can't get there unless you are dealing with very high quality applications.

Second, it is worth recalling that the 2005 Act was passed somewhat in the context of the MIT report—Dr. Meserve was involved in it—recommendation of a few first mover plants and the need to stimulate those and get the process going. That might perhaps have been manageable in the context of reviewing the generic designs that were pending. But unfortunately it was done in such a way that it triggered a much larger rush of applications than a few first mover plants.

So you now have a situation in which a much larger and less well coordinated slug of work than was contemplated is going through the NRC process that is going to take several years.

My additional concern arising from both this testimony and the previous panel's interaction with the Committee is that steps are now being taken that will make that dilemma even worse. That is, the piling of yet a larger number of applications into a regulatory process that is already having a great deal of trouble dealing with the ones that it already has.

Senator CARPER. Good. Thank you. Thank you for those comments.

Dr. Singh, some reactions, if you would, to your colleagues' comments.

Mr. SINGH. I will be glad to follow on. The one thing that we should realize that the NRC is undergoing a huge turnover in staff. The experienced people are retiring. They are bringing in new people, and the new people, of course, are not as versed in NRC's principles such as reliability. And we are seeing a great deal of changes and confusion in their regulatory positions coming from the staff. And that is making licensing longer. It is consuming more of NRC's resources. It is causing trouble all the way around.

To the extent that NRC were to increase its training and indoctrination programs and have additional resources, they will need to get to them, and they will need to deal with these basic principles that people have talked about here, such as reliability, consistency in rulemaking and so on. We have a problem there right now.

The other area is employment, which is, as I said, a central theme of my presentation here. I am very pleased to hear that UniStar and their partners are establishing employment centers in the country, and that will help. And that is wonderful. But I think that from the NRC standpoint, and I say that in my written testimony that I have submitted, it probably would be not abnormal for the Government to direct the regulator that for applications that will create jobs within the U.S., they will get priority. They will all be reviewed, but the ones that will create greater employment in the country will get priority.

I don't think that is illegal. I don't think it is against WTO rules. I am speaking for the people who don't have work. I get letters from them every month asking for employment. And I say something is wrong if people with 20, 30 years of first rate experience in making things are sitting home. That just isn't right.

Senator CARPER. Good. Thank you. I agree.

Mr. Vanderheyden, any comments and reflections on your colleagues' remarks?

Mr. VANDERHEYDEN. Yes, thank you, Senator Carper.

I think actually as Dr. Meserve said, I think there is more in agreement than we disagree on.

Senator CARPER. Sometimes that happens.

Mr. VANDERHEYDEN. That does happen, and it is good. I agree with Dr. Bradford's comments, and I would sort of summarize it this way in my own words. New nuclear energy cannot advance in this country without a strong regulator, nor can it advance without a public that has confidence that we have a strong regulator, and also confidence in us as the applicant.

To further some of those comments and give you some statistics, as we pursued our new nuclear project in southern Maryland, we have had so far over 15 public meetings. And we have had over 1,000 members of the public participate in those public meetings and provide comments to both us, the Nuclear Regulatory Commission, the State of Maryland, and the local community that also is required to permit these projects, on what they think is necessary in order to protect their health and safety.

And in all cases, we have honored those requests and answered those questions to the point that we have answered today some 1,937 questions and requests for additional information from both our regulators and the public.

I do think that in this environment of a very open and transparent process in dealing with the regulator and the public, it is still important that we set at least goals and targets versus requirements, but goals and targets for the completion. Because it is important to us to have a relatively predictable process, given these are multi-billion dollar projects.

And I just would recommend, as was discussed between yourself and Senator Lamar Alexander, I thought that was an excellent discussion, that you review our requests for additional congressional oversight. And I meant what I said to hold both us as the applicant, as well as the NRC, accountable to completing these efforts that are important for our country.

Thank you.

Senator CARPER. Thank you for those comments.

I want to come back to the central theme, if I could, of Dr. Singh's comments on employment. As our folks, both Democrats and Republicans, here like to say, and I suspect Independents, we have a couple of Independents, too, that our priority for this year has been really three-fold. The first most important priority has been jobs. The second has been jobs. And the third has been jobs.

We are proud in Delaware that sometime in 2012, the deployment of a windmill farm 12 miles off the coast of Rehoboth Beach will proceed. And we are excited about the prospect of the clean energy that it will create. We have this vision of eventually windmill farms maybe from off the coast of North Carolina up to Maine, and all kind of linked together and providing carbon-free energy for fleets of plug-in hybrid vehicles, some of which would be made in Wilmington, Delaware, at an old G.M. plant by a new car company called Fisker.

And that seemed to me to be a pretty good vision. It would be unfortunate if the windmills and the windmill farms and transmission systems, and frankly, if the plug-in vehicles were all made

someplace else or components made someplace else. If we let that happen, shame on us.

When I hear your comments, Dr. Singh, with respect to nuclear, I am reminded that the same is true with other forms of carbon-free electricity.

Let me ask our colleagues on the panel just to focus, to drill down, if you will, probably the wrong term right now, drill down, but to drill down on Dr. Singh's comments about revitalizing the manufacturing base in this country and particularly with respect to the nuclear industry. If others would reflect on what he said and share your thoughts with us, including what we ought to be doing legislatively either in Congress or the Administration, maybe the NRC. I would welcome your thoughts.

Yes, sir. Mr. Vanderheyden.

Mr. VANDERHEYDEN. I agree with Dr. Singh's comments and the importance of jobs, jobs, jobs, as you said, Senator Carper. And I would just state that when we started UniStar Nuclear Energy back in 2005 with the passage of the Energy Policy Act, one of our requirements that we did not need to do, but we thought was very important, to Dr. Singh's comments, is anyone that does business with UniStar Nuclear Energy, wherever they may be around the world, is required to reinvest in America and required to reinvest in jobs in the United States.

And I mentioned earlier that we signed a very large contract with our strategic partner, Alstom, who is a French company, to Dr. Singh's comments, but what they did was reopened the facility in Chattanooga that has been closed since the 1950s. And as I mentioned, created about 350, they are in the process of creating 350 manufacturing jobs. And that facility will actually have its grand opening in about a month.

So it has been our passion, and it has been our requirement that for foreign companies that we do business with, they open U.S. offices.

Senator CARPER. Dr. Bradford, any comment?

Mr. BRADFORD. The jobs issue with regard to new nuclear is a complicated one. Let me just give you a sense of the way I have seen it playing out in Florida, where I have been involved in a couple of regulatory proceedings.

Right now what is happening as a result of laws the State has passed, electric rates are going up in order to pay for the Levy County and Turkey Point units, even though the two utilities that want to build them have not made a firm commitment to do so.

So there's been a backlash among the industrial customers and the large commercial customers saying essentially this is a job killing proposition in the short run when we most need new jobs, because we are paying higher electric bills which has an interplay with our productivity and the number of people we can employ. But the jobs in terms of nuclear construction are pretty minimal. A fair part of what we are paying is going to hold places in line in Japan where the equipment will be manufactured.

So the new nuclear jobs are off in the future and the recession we are trying to deal with is imminent.

The second concern, which comes from my own experience regulating in the Northeast during the last round of nuclear construc-

tion, is similar. That is that utilities heavily committed to building a new nuclear plant, especially one on which the costs seem endlessly to be escalating, will de-emphasize alternatives.

We saw Public Service in New Hampshire fighting against the Hydro-Quebec transmission line to supply the Boston area because of concerns about the marketability of Seabrook Power. We saw the Long Island Lighting Company reluctant to expand its gas system because of the need to protect the market for Shoreham. We saw resistance throughout the region to energy efficiency programs as long as the struggles over those two plants, as well as Nine Mile 3, were continuing.

So, yes, there certainly are jobs to be created in building new nuclear plants, but it is important to focus on the net impacts, not the gross impacts. And it is much less clear that the net impacts are all that favorable, especially in the short run.

The situation, I should add, is somewhat different in Maryland's case where you don't have a Utilities Commission regulating generation and therefore can't charge construction work in progress, and so you are not seeing those short-run rate impacts.

Senator CARPER. Thank you.

Dr. Meserve, any comment?

Mr. MESERVE. Well, let me say I can comment on this, but I cannot comment on this from the perspective of the Bipartisan Policy Center because we did not look at this issue. And I am considerably less knowledgeable than some of my other panelists on this subject.

I think it is apparent if one thinks about the actual construction of the plant that a lot of the construction workers, a lot of the craft workers, ultimately the operators of the plants are going to be Americans. The issue is going to be for the equipment that goes into the plants, various pumps and those sorts of things. And because we haven't built plants in the United States for a long time, we have some reliance that we have to have on foreign vendors for those things.

My expectation would be that once there is a market and we build more nuclear plants that market forces will apply and that these business opportunities, people will take them.

You started this with a question whether there is anything that the Congress could do in this area, and I don't have a clear answer to that. It does seem to me that there is a phase-in problem and that you need to get these things in place, certainly in terms of personnel. Having educated personnel is a pipeline issue in terms of having people who have the necessary education. I know that traditionally Congress has tried to stimulate that in various ways, and that is clearly appropriate with regard to some of these issues.

Senator CARPER. Thank you.

Let me come back to Dr. Singh for a follow up. Americans regard ourselves as the early pioneers. We are the early pioneers of nuclear technology. And at least to me, American nuclear manufacturing and technology represents maybe the highest quality of safety and reliability. Is that a statement you would agree with?

Mr. SINGH. Yes, I absolutely do. Nuclear energy originated here. This is where it became a safe form of energy. If you look at the parallel development in the Soviet Union, they ended up in

Chernobyl. The development of safe nuclear power in the United States, this is where it occurred, and it is a matter of pride for human civilization, what happened from the mid-20th century and continuing on now.

The tragedy is that in the past 30 years, as Mr. Meserve said, there has been significant loss of manufacturing base. Yet, I would also state that there is enough of the residual of that base available here that we can build. We can begin building all of the complicated equipment that currently is going overseas.

Now, all I am asking is that the multinationals who operate in this country through the regulatory process get some incentives to explore those domestic resources. We can revive manufacturing in the United States. And I think it could be the critical technology base for the country. It is the same people who make aircraft carriers, the same people that make defense equipment, the same know-how, welders, fitters. It is the same skill sets.

And we have billions in loan guarantees coming from American taxpayers. Heck, we should also channel the legislation, the law, the guidance in such a way that these people instead of watching daytime television are working in factories making the equipment and keeping our technology know-how intact in this country.

Senator CARPER. Thank you.

A group of us in the Senate had the privilege of spending some time yesterday afternoon with Chairman Ben Bernanke, the Chairman of the Federal Reserve, and we talked about a wide range of subjects. One of the issues we discussed was the state of the economy and economic recovery.

I mentioned to him that oftentimes when we see our economy bouncing back as it is today, it is not uncommon for the resurgence to be led by consumer spending. Or it is not uncommon for it to be led by home building, the housing industry. This is one of those recoveries which has the very real potential of being led by manufacturing, a resurgence in manufacturing.

We were part of a meeting that Senator Stabenow of Michigan hosted earlier today with a number of green energy companies from around America, some pretty big ones and some fairly small. And I was very much encouraged by what they are reporting in terms of increased business, increased employment opportunities, and the potential for more.

They pretty much had a consistent message for us, in their view, to really launch the tsunami of economic activity and creating jobs and technologies that we cannot only use here, but export abroad with respect to conserving energy and providing carbon-free energy. Basically, there are three things that we ought to do. The first thing that they suggested was put a price on carbon. The second thing they asked us to do is put a price on carbon. And the third thing they asked us to do was put a price on carbon.

So my hope is that we find ways to use less energy, and that we will find a way to put a price on carbon. We have 60 votes here and should be able to send something to the President's desk this year.

I will just make this a short question and ask you just to comment very briefly, Dr. Singh. But with respect to our nuclear manufacturing base and the technology, if we lose our nuclear manufac-

turing base, and I think we have gotten pretty close to losing it, but if we lose it altogether in this country, does that somehow threaten our energy and our national security? If you could each briefly comment on that, I would appreciate it.

Mr. SINGH. I believe so. I believe that a country that loses its base for manufacturing complicated weldments, vessels and component systems that involve complicated welding and fitting and machining, if it loses that base, then along with it it loses a level of national security. After all, in times of crisis, you are not going to order the warships to be made in China.

And if you don't have domestic welders and fitters, and please realize it is a skill that is acquired over decades. People work. They learn. They acquire the knowledge to make complicated things. And if we put them out of work, and we keep them out of work, and they get old, and they pass on, you basically have de-industrialized yourself.

And that is where this country is at. The people I worked with 30 years ago, they have retired. Most have died. And there are no replacements because there is no work in this country. The work has gone overseas. So it is a matter of national security.

Senator CARPER. I want to turn to the subject of openness and transparency for a little bit, if we could, and invite several of you to comment on that. I would be interested especially in Dr. Bradford your thoughts and comments, maybe those of Dr. Meserve, but really anyone.

The Congress used to operate with a lot less openness and transparency than we do today. Sessions like this were not televised. We had reporters who could attend, but they weren't generally made available to a variety of media to people throughout this country, throughout the world. We didn't televise the Senate or the House in session. I think the House went first and then later the Senate.

I will be real honest with you. Sometimes I have probably been guilty of this before, but every now and then discussions can be more fruitful to an extent when they are held in confidence than if they are broadcast live. Every now and then I have seen a couple of my colleagues, I won't use the term demagogue, an issue, but say some things in public for public consumption that maybe in their hearts they didn't fully subscribe to.

On the other hand, people in this country have a right to know what we are thinking and what we are doing. And so there is a tension here on what is the right amount of openness and transparency, and maybe can there be too much of a good thing.

I would welcome any thoughts that Dr. Bradford and Dr. Meserve and others have on this point. This is probably my last question.

Dr. Bradford.

Mr. BRADFORD. I certainly can sympathize with the proposition that some forms of openness can be corrosive in terms of discussions that go on within a group. I have chaired commissions that were subject to sunshine laws, and I have chaired commissions that weren't.

In most respects, it didn't make that big a difference, but from time to time I saw exactly what you have seen, the demagoguing of an issue because of a public forum. To me, the public access to

information, that is the freedom of information law, is a much more vital protection than sunshine law types of arrangements, the ability to get at the documents, get at the numbers.

For example, just to pick on that is current, the Department of Energy's proposal to withhold the amount that it will charge for loan guarantees seems to me to be just incomprehensible in terms of principles of transparency. But that is different from sunshine law types of concerns.

The other area that is of concern to me in terms of openness in governance principles are, as I mentioned, the ways in which, it seems to me, the Commission has closed off access within its proceedings to effective participation by intervenor public interest citizen groups, even State government participants, by denying cross-examination, by denying discovery.

I have been an expert witness often enough in the last few years to know that there is a big difference between the level of scrutiny one experiences in a proceeding that allows real cross-examination by lawyers representing interested parties and ones where the cross-examination function is somehow funneled entirely through the presiding officer.

There is a lot more effective openness when the attorneys are actively participating. And there is not a big time savings to be had from foreclosing that road. What does change is the exposure of the applicant and of the NRC staff to potential embarrassment if they have done something wrong, but that is exactly what you don't want to protect.

So it is in those areas that I am most concerned.

Senator CARPER. Thank you.

Dr. Meserve.

Mr. MESERVE. Let me say, I understand there has been some comment or criticism that the actual processes within the Commission itself have been some doubt about the openness issues there. I am not going to comment on the hearing issue, which usually typically involves a licensing board.

In my experience, it is a very open process that the Commission currently follows. And I would be cautious about changing it in radical ways. I say it is an open process in the following sense. Typically, when there is an important issue, there is a staff paper that is prepared. It is called a SECY document. It is one of those acronyms.

Senator CARPER. What is it called?

Mr. MESERVE. S-E-C-Y. It indicates that the Secretary circulates it to the Commission.

Senator CARPER. Thank you.

Mr. MESERVE. But that goes to the Commission, and it is available publicly at the same time the Commission is deliberating. Typically, the Commission has a public meeting on an important issue where it brings in panels of people who have stakes in these issues, and it has an opportunity for interchange with them in a fully public process.

And then the next step is then a voting process within the Commission. And that typically involves—it always involves the preparation of a written vote which is then circulated among the Com-

mission and eventually becomes a publicly available document, as it should be.

I would be quite hesitant on changing the notation process. And I am not sure that there is any serious proposal to do so. Because in many respects, on the issues that the Commission decides, they are detailed technical issues that involve congressional history at times; at times involves interpretation of statute; involves detailed engineering questions.

And actually having written submissions from each of the Commissioners explaining their vote and how they got there is a very useful exercise for not only crystallizing their own thinking but also making transparent to the public exactly how people came out in a way that would not otherwise be available.

And I can note from my own experience that there were times when, after people reviewed the written vote from someone else, they changed their own vote in a way that would never have happened at a meeting because they had an opportunity to think about the vote, look at the review materials, and so forth.

And so I am sure there are ways the process could be improved, but I think that to the extent that the notation voting process itself is being criticized, I think that we ought to be quite cautious before we make changes in it.

Senator CARPER. Dr. Singh, Mr. Vanderheyden, any comments at all?

Mr. SINGH. Thank you, Mr. Chairman. I have no comments. I am looking to catch the train.

[Laughter.]

Senator CARPER. All right. I know that feeling. I know that feeling every day.

It has been terrific, and you are good, some of you, to come back again to share your thoughts with us in this forum. It has been very constructive and instructive, which is what I hoped would happen.

Some of my colleagues will have some questions they would like to submit to you for the record. I may have one or two as well. And my staff reminds me that we will have 2 weeks to submit the questions to you, and we would ask that you respond promptly.

I want to thank our staff for the work that they have done in helping us prepare for this hearing, and to each of you who joined us today.

Good luck on catching that train, and I hope to catch one later today myself.

Thanks very much. This hearing is adjourned.

[Whereupon, at 12:50 p.m. the Subcommittee was adjourned.]

